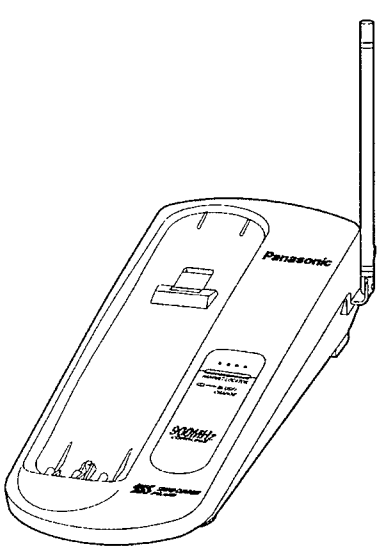
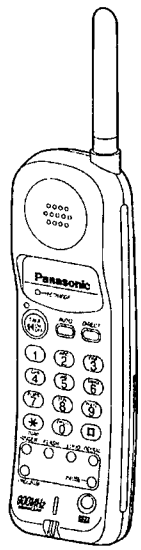
ORDER NO. KM49903399C1
F11

Service Manual

Telephone Equipment



(Base Unit)



(Handset)

KX-TC1400B
KX-TC1400W

900MHz Cordless Phone

Black Version

White Version

(for U.S.A.)

SPECIFICATIONS

	Base Unit	Handset
Power Source:	AC Adaptor (KX-TCA1-G)	Rechargeable Ni-Cd battery
Receiving Frequency:	30 channels within 926.1~927.55 MHz	30 channels within 902.1~903.55 MHz
Receiving Method:	Double super heterodyne	Double super heterodyne
Transmitting Frequency:	30 channels within 902.1~903.55 MHz	30 channels within 926.1~927.55 MHz
Oscillation Method:	PLL synthesizer	PLL synthesizer
Detecting Method:	Quadrature Discriminator	Quadrature Discriminator
Tolerance of OSC Frequency:	±3.6 kHz	±3.6 kHz
Modulation Method:	F3 (frequency modulation)	F3 (frequency modulation)
ID Code:	20-bit	20-bit
Dial Mode:		Tone (DTMF)/Pulse
Redial:		Up to 32 digits
Speed Dialer:		Up to 22 digits
Power Consumption:		21 days at Standby, 8 hours at Talk
Dimension (H × W × D):	2 6/32" × 4 17/32" × 8 15/32" (55 × 115 × 215 mm)	9 9/16" × 2 8/32" × 1 1/2" (243 × 53 × 38 mm)
Weight	0.57 lbs. (260 g)	0.49 lbs. (220g) with battery

Design and specifications are subject to change without notice.

Panasonic

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When replacing, the following precautions will help prevent recurring malfunctions.
1) Cover the plastic parts boxes with aluminum foil.
2) Ground the soldering irons.
3) Use a conductive mat on the workable.
4) Do not grasp IC or pins with bare fingers.

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1 STANDARD BATTERY LIFE

If your Panasonic battery is fully charged;

While in use (TALK)	Up to about 8 hours
While not in use (Stand-By)	Up to about 21 days

- Battery life may vary depending on usage conditions and ambient temperature.
- **Clean the handset and base unit charge contacts with a soft dry cloth once a month. Clean more often if the unit is subject to grease, dust or high humidity.** If not, the battery may not charge properly.
- If the battery is fully charged, you do not have to place the handset on the base unit until the RECHARGE indicator flashes. This will maximize the battery life.
- The battery cannot be overcharged.

11 HOW TO REPLACE FLAT PACKAGE IC

11.1. Preparation

- SOLDER

  Sparkle Solder 115A-1, 115B-1 or Almit Solder KR-19, KR-19RMA

- Soldering iron

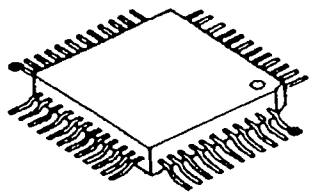
  Recommended power consumption will be between 30 W to 40 W.
  Temperature of Copper Rod 662 ± 50°F (350 ± 10°C)
  (An expert may handle between 60 W to 80 W iron, but beginner might damage foil by overheating.)

- Flux

  HI115 Specific gravity 0.863
  (Original flux will be replaced daily.)

11.2. Procedure

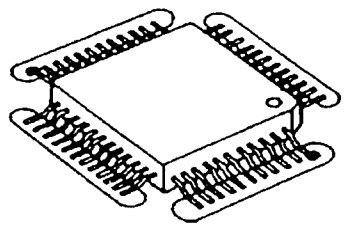
1. Temporary fix FLAT PACKAGE IC by soldering on two marked 2 pins.



●- - - - - -Temporary soldering point.

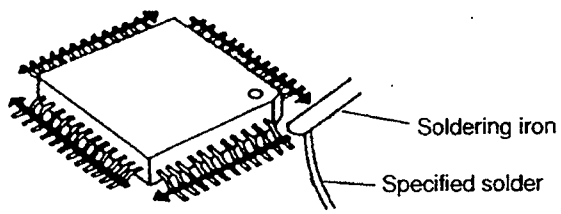
*Most important matter is accurate setting of IC to the corresponding soldering foil.

2. Apply flux for all pins of FLAT PACKAGE IC.



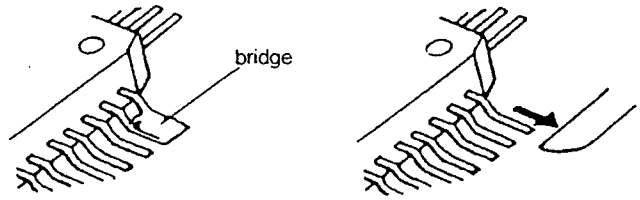
- - - - - - Flux

3. Solder employing specified solder to direction of arrow, as sliding the soldering iron.



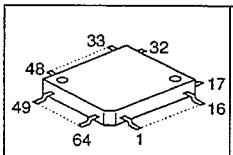
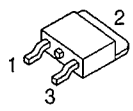
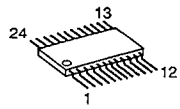
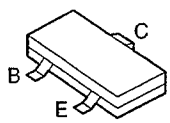
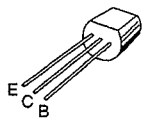
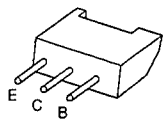
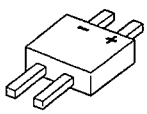
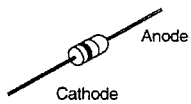
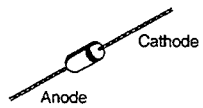
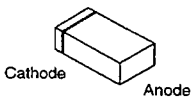
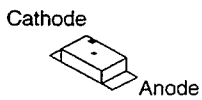
11.3. Modification Procedure of Bridge

1. Re-solder slightly on bridged portion.
2. Remove remained solder along pins employing soldering iron as shown in below figure.

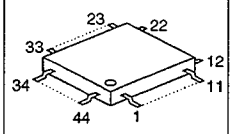
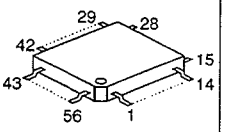
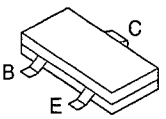
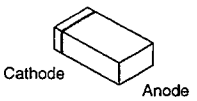
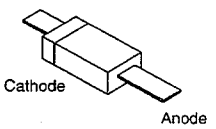
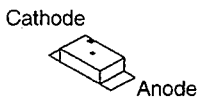


12 TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

12.1. Base Unit

 MN150832BB1	 PQVIL7806D2T	 AN6137SB
 2SC4116, 2SD601R, 2SC2120	 2SA1625 PQVT2N6517CA	 2SD1991A, 2SD1994A
 PQVDS1ZB40F1	 MA4180, MA4300	 ISS133
 MA110, MA8220	 PQVDPY1112H	

12.2. Handset

 PQVI9046G014	 AN6139FA	 2SD1819A, PQVTD123T146
 MA8150, MA111 MA2ZD1400	 PQVDPTZTE25, MA736	 PQVDSML310MT, PQVDBR1111C

13 FOR SCHEMATIC DIAGRAM

13.1. Base Unit

Notes:

1. S201: Handset Locator Switch
2. DC voltage measurements are taken with voltmeter from the negative voltage line.

> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

This schematic diagram may be modified at any time with the development of new technology.

13.2. Handset

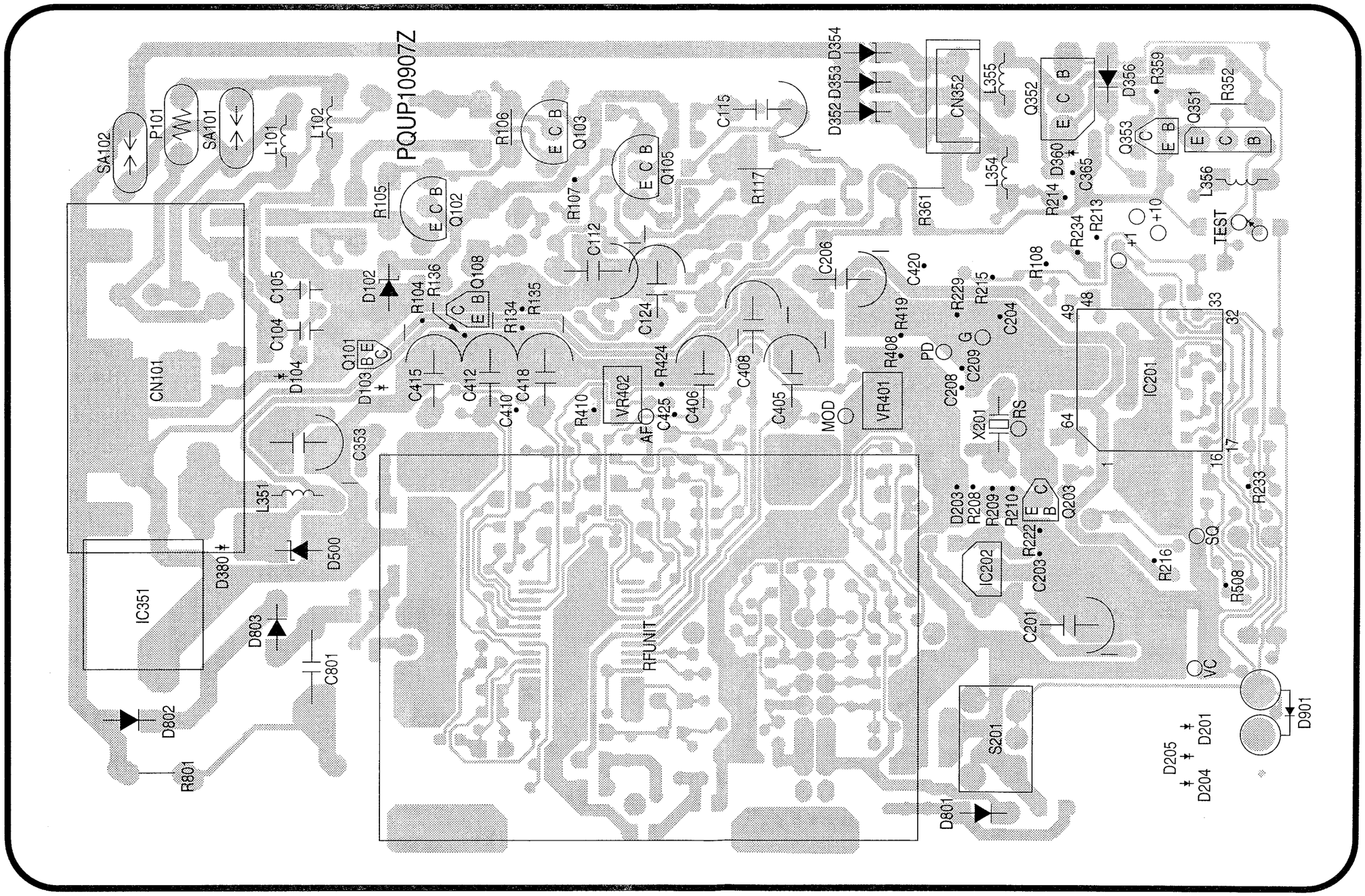
Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

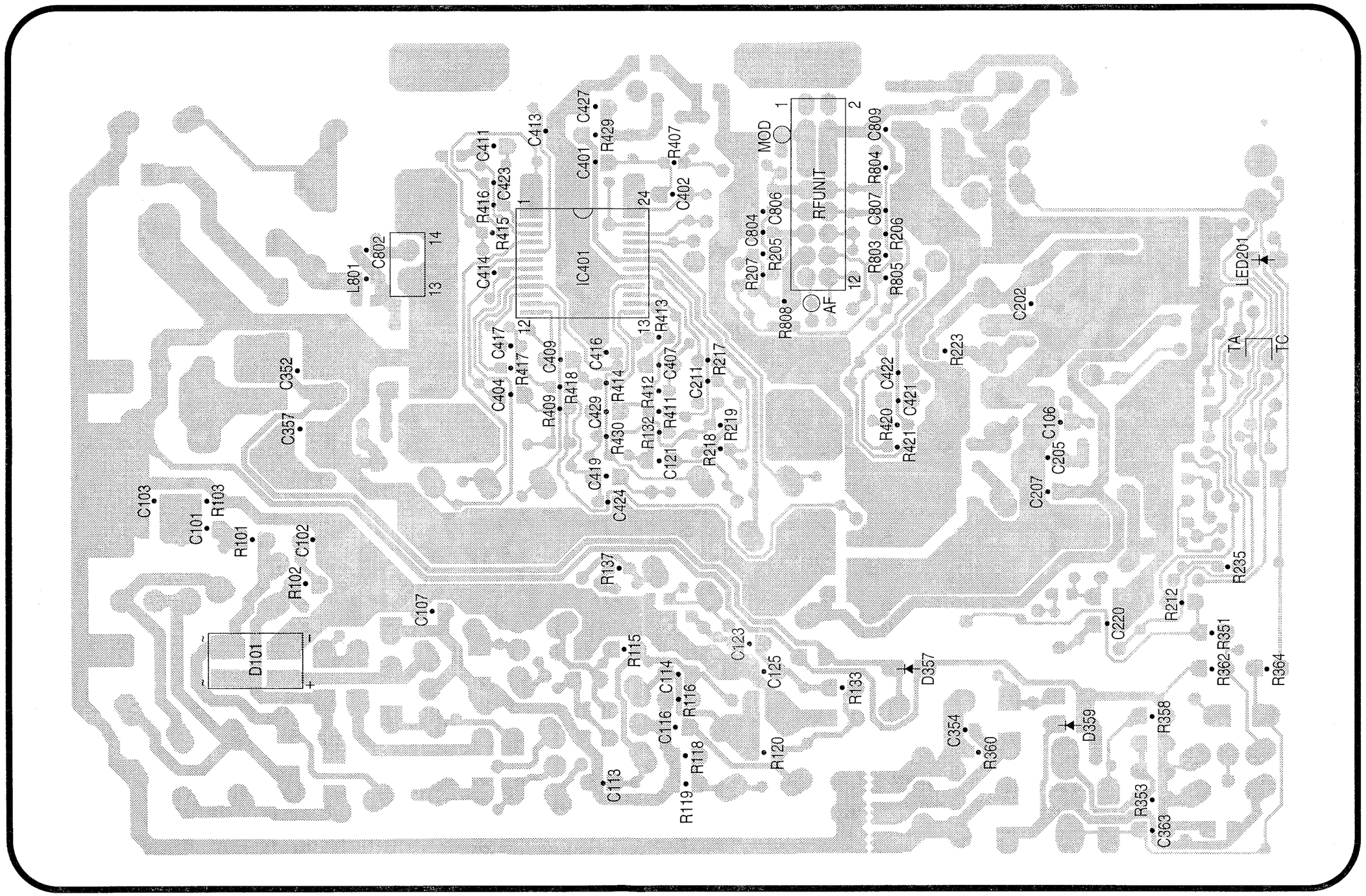
This schematic diagram may be modified at any time with the development of new technology.

14 CIRCUIT BOARD (Base Unit)

14.1. Component View

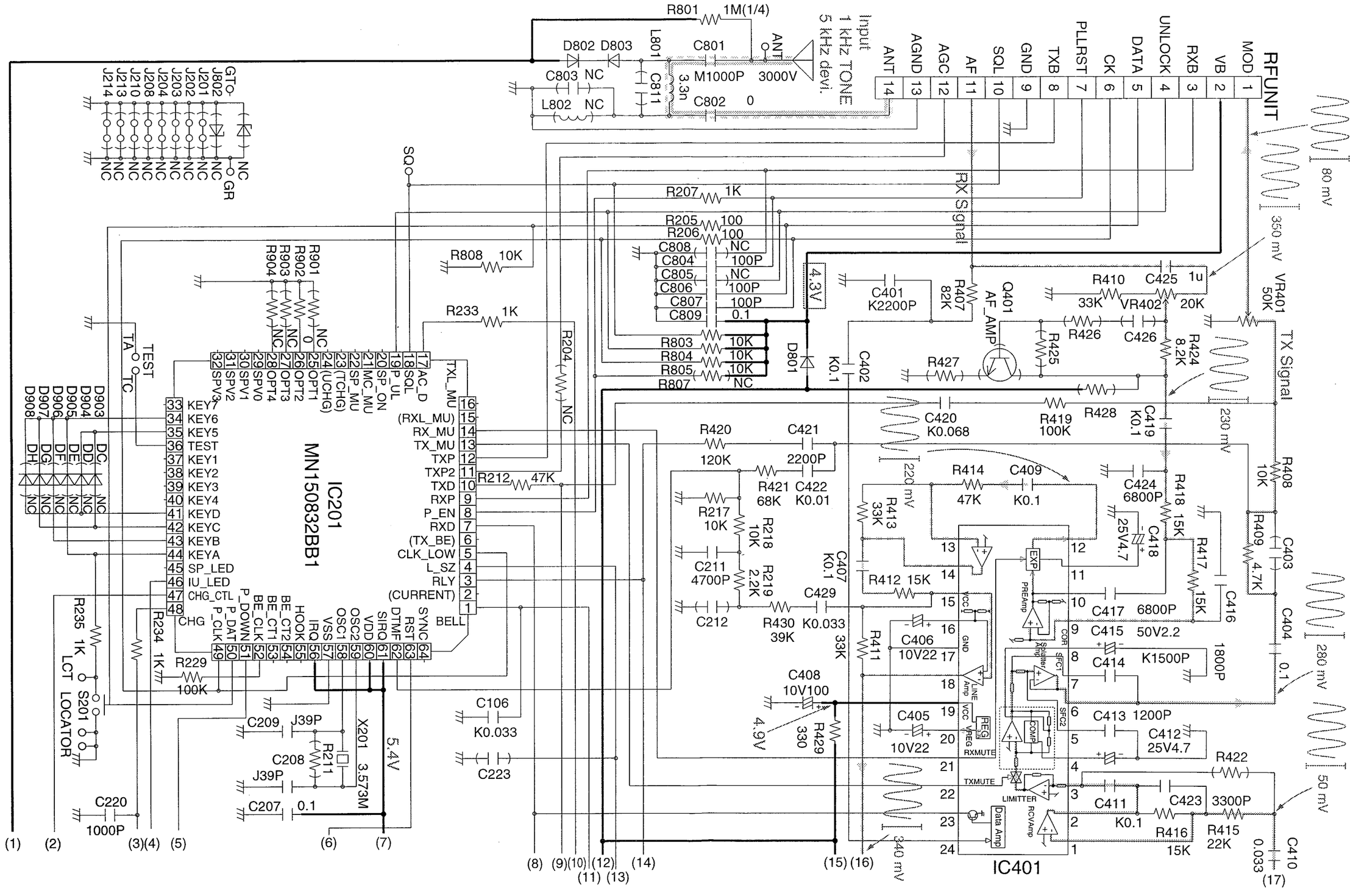


14.2. Flow Solder Side View (Base Unit)

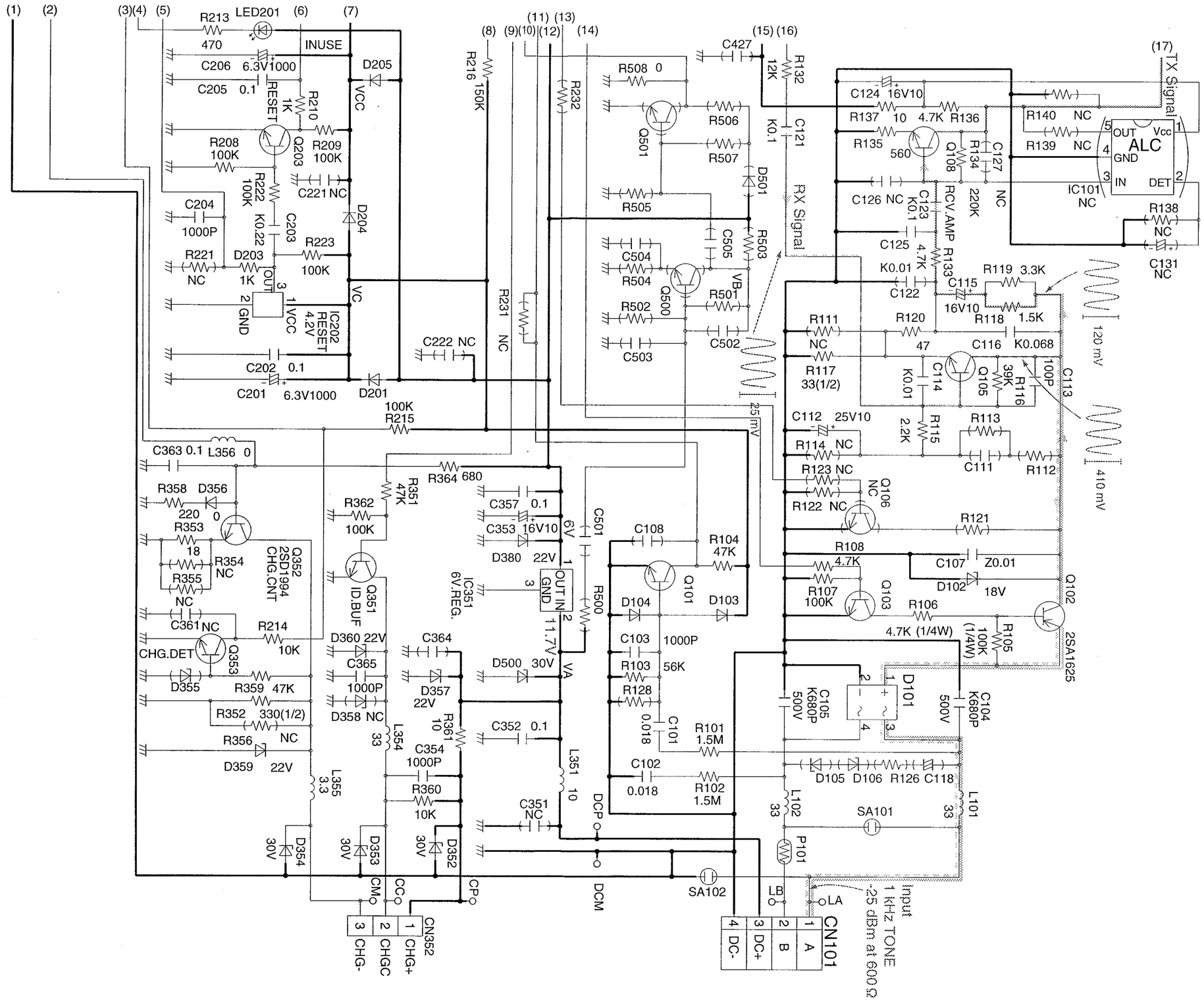


15 SCHEMATIC DIAGRAM (Base Unit)

15.1. Base Unit No. 1

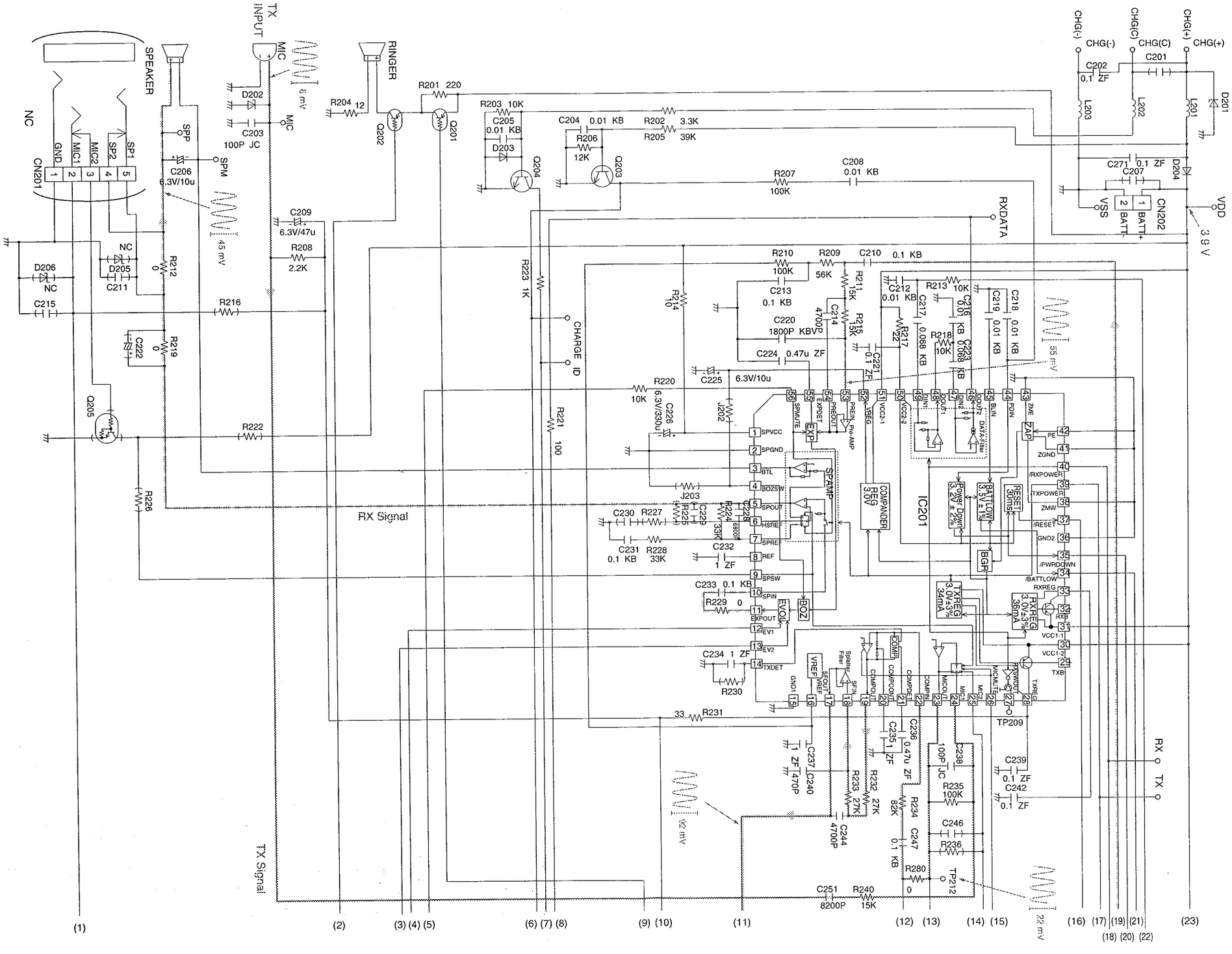


15.2. Base Unit No. 2

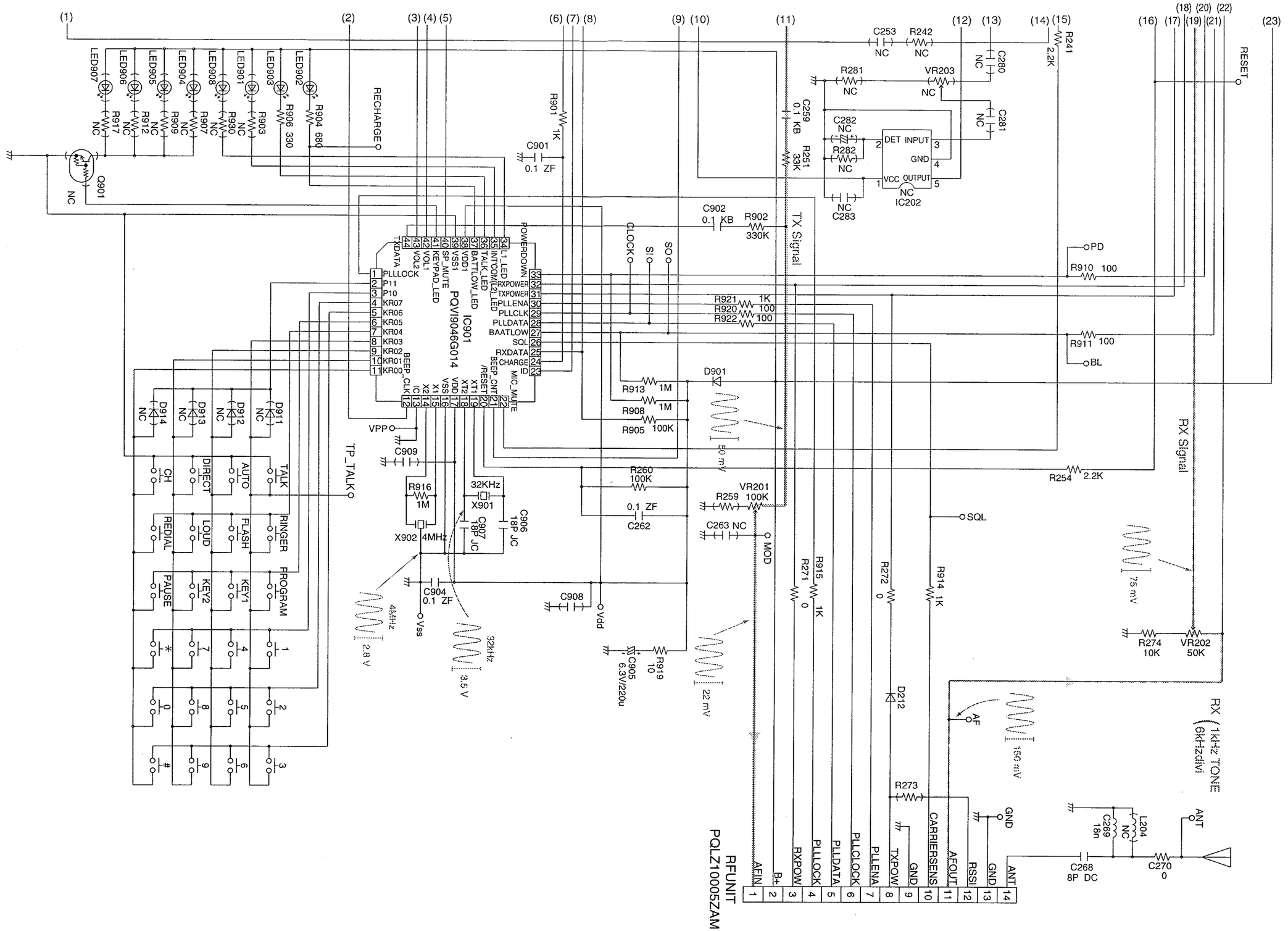


16 SCHEMATIC DIAGRAM (Handset)

16.1. Handset No. 1

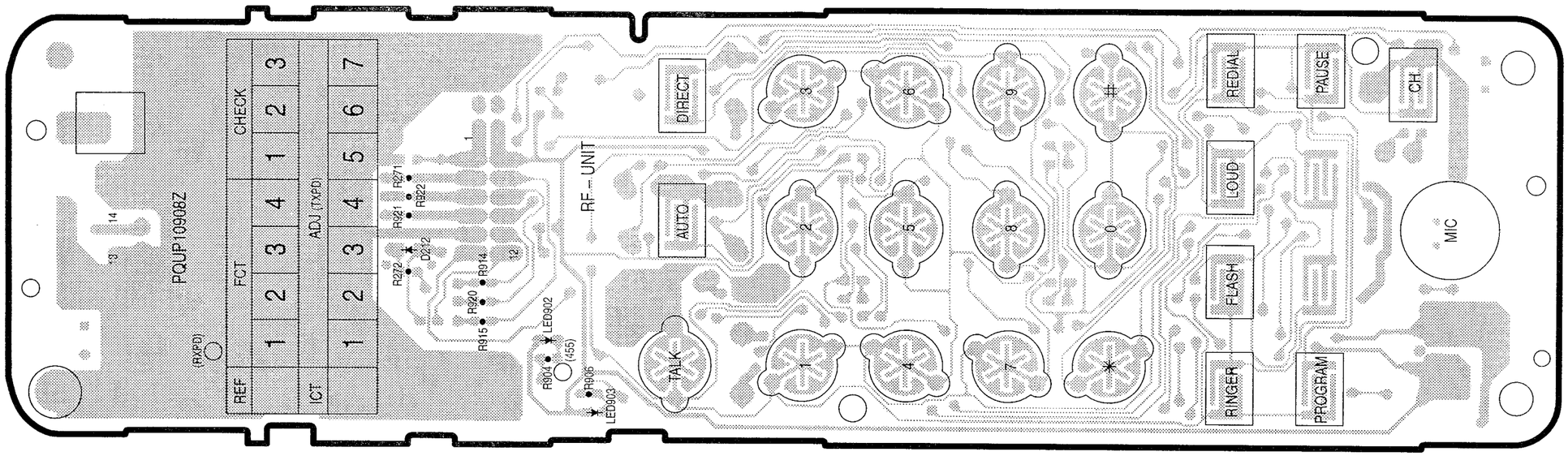


16.2. Handset No. 2

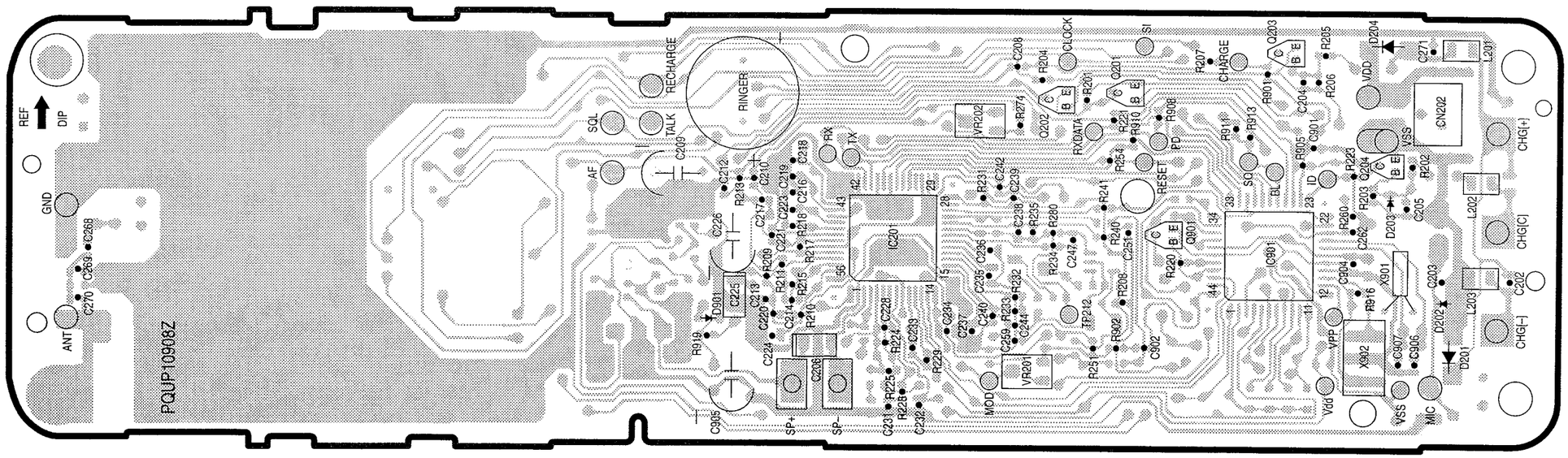


17 CIRCUIT BOARD (Handset)

(Component View)



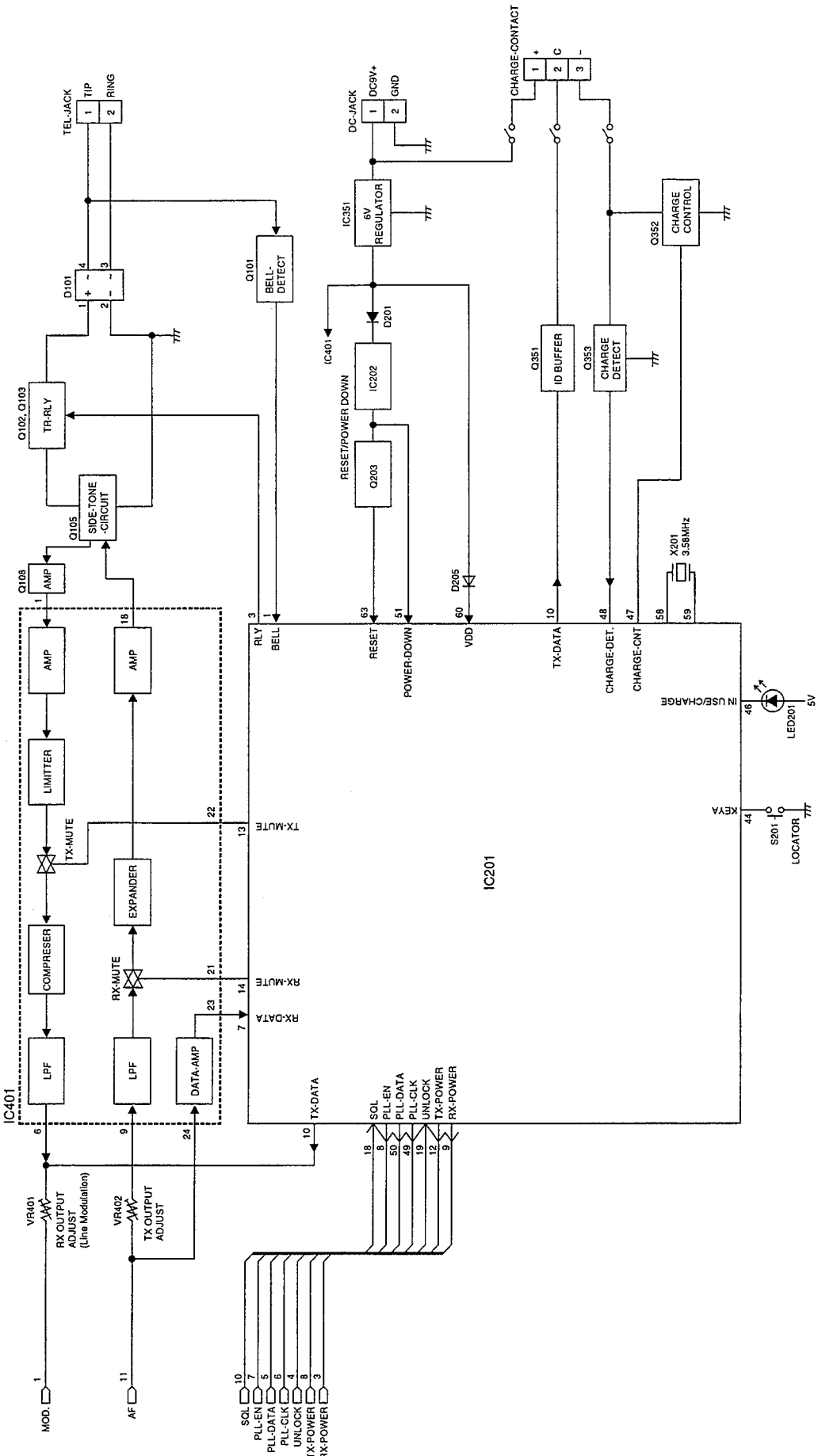
(Flow Solder Side View)



17.1. MEMO

18 BLOCK DIAGRAM (Base Unit)

18.1. Main P.C. Board

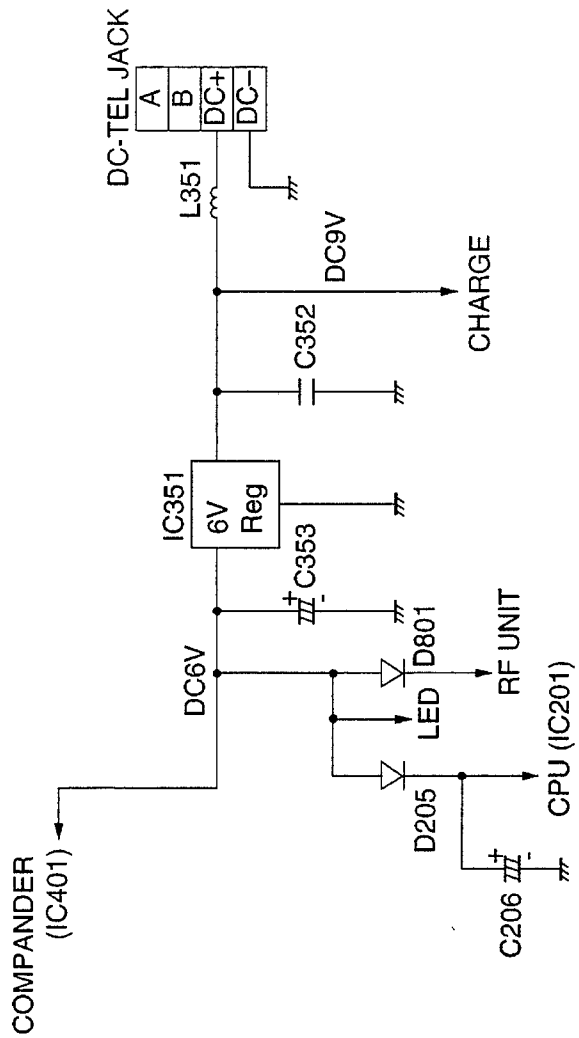


19 NEW CIRCUIT OPERATION (Base Unit)

19.1. Power Supply Circuit

As indicated in the illustration, the various voltages are supplied constantly to their respective blocks. A time constant is used to compensate for momentary dropouts in the AC power supply.

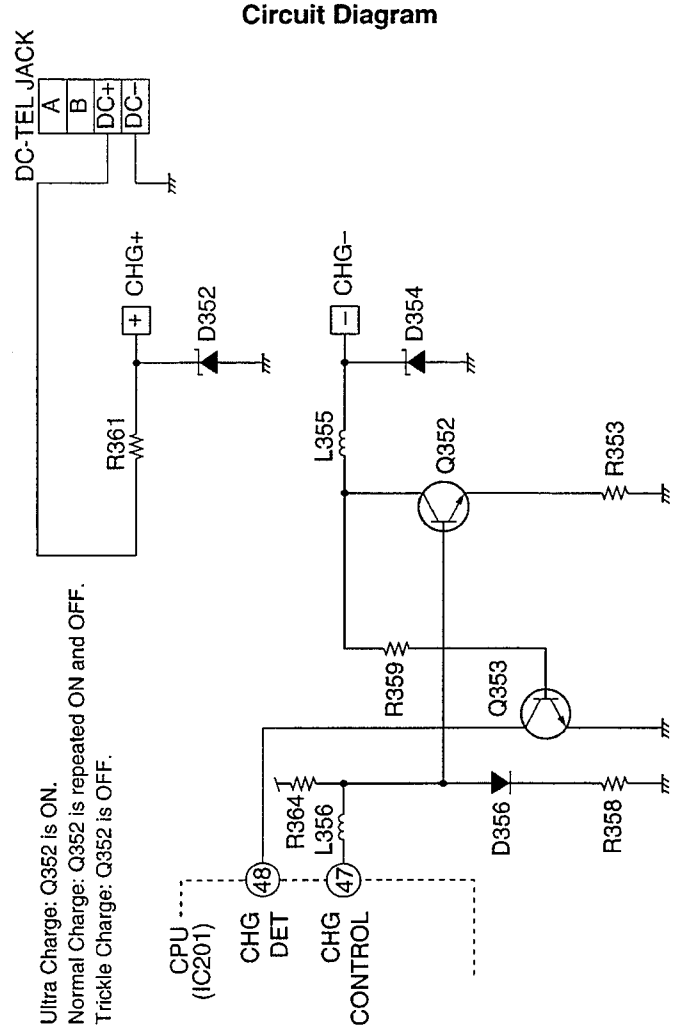
Circuit Diagram



19.2. Charge Circuit

The voltage from the AC is supplied to the main charge circuits. Normal charge (60mA) is started soon after the Handset is placed on the base unit. After 15 hours the mode changes to trickle charge (18 mA) to prevent overcharging.

Circuit Diagram



19.3. Bell Detector Circuit

When the CPU detects the Bell signal, pin 46 repeats High/Low fluctuation and then IN USE LED (LED201) in use is flashed.

At this time, if the Handset has been charged, the data from pin 10 is sent through the control terminal and then the Handset's ringer rings.

If the Handset has been not charged, the data signal generated by pins 10 of the CPU is sent to the Handset through RF Unit and then the Handset's ringer rings.

19.4. Line Interface

In talk status, the RLY output from pin 3 of IC201 changes to High level, it causes Q103 and Q102 to turn on. A telephone line is seized in result. The loop current flows from D101(+)→Q102, in that order. A pulse signal that repeated switches between high and low level is output from pin 3 of the CPU. This switches the line loop on and off, to generate the dial pulse signal.

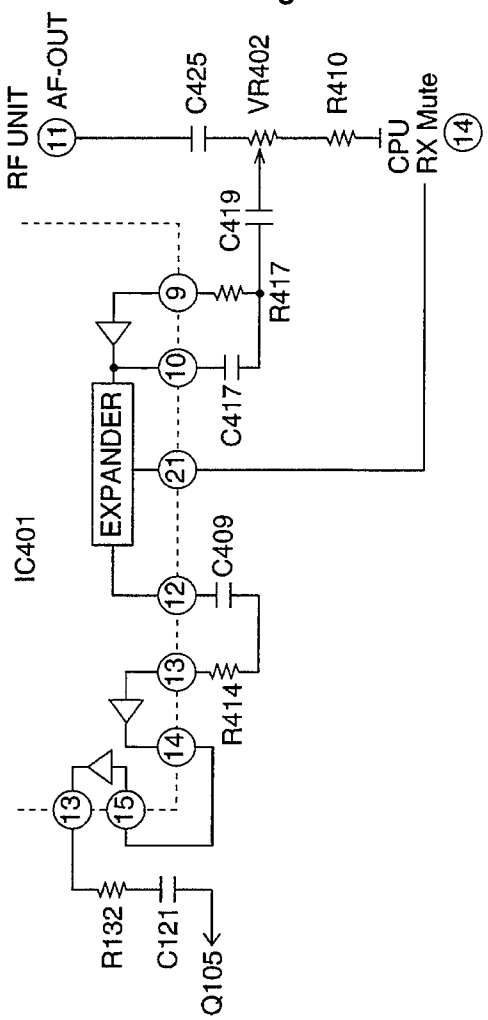
19.5. DTMF Signal

When the DTMF data from the Handset is received, the DTMF signal is output from pin 62 of the CPU and sent to the line through R218 → IC401 pin 15 → IC401 pin 18 → Q105.

19.6. Line Sending Signal

The AF signal output from the AF terminal of the RF unit is adjusted to the appropriate level by VR402, then it is input to IC401. The RX DATA signal from the Handset is muted at this point by IC401 to prevent the RX DATA from leaking onto the line. In this way the noise is suppressed. IC401 comprises a LPF, a Pre Amp and an expander. The signal compressed by the Handset is expanded in IC401 to recreate a original signal. The output from the expander passes through amplifier Q105 before being input to line.

Circuit Diagram

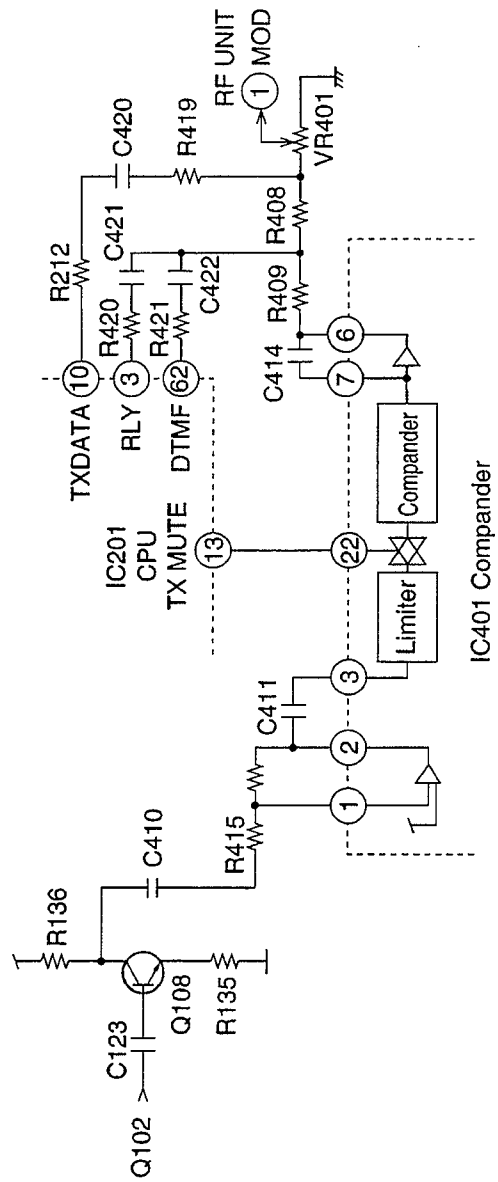


19.7. Line Receiving Signal

The audio signal from Q102 is amplified by Q108 and input to IC401. IC401 comprises an amplifier, limiter, mute circuit, compander, and LPF. It performs signal processing. The audio signal output from pin 6 of IC401 is mixed with the DTMF, TX DATA and DIAL signals.

At this point (in the talk mode), the DTMF tones, pulse dial tones, and data transferred between the Handset and base unit is input to the modulator circuit.

Circuit Diagram

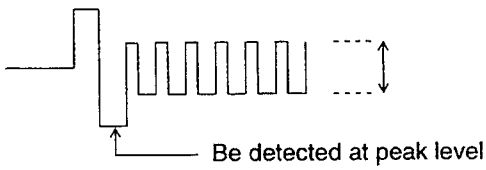


19.8. RX Data Circuit

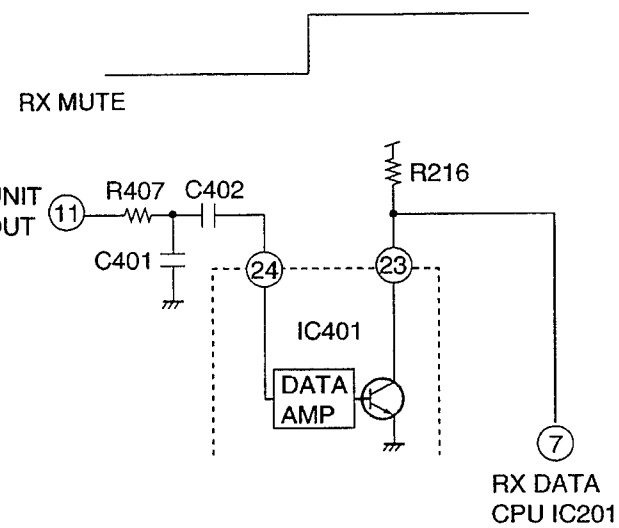
The demodulated data waveform is then input to RX DATA pin 7 of the CPU.

If there is data from the Handset during talk operation, the Handset data is as shown below to prevent the data from leaking onto the line.

Timing Chart



Circuit Diagram

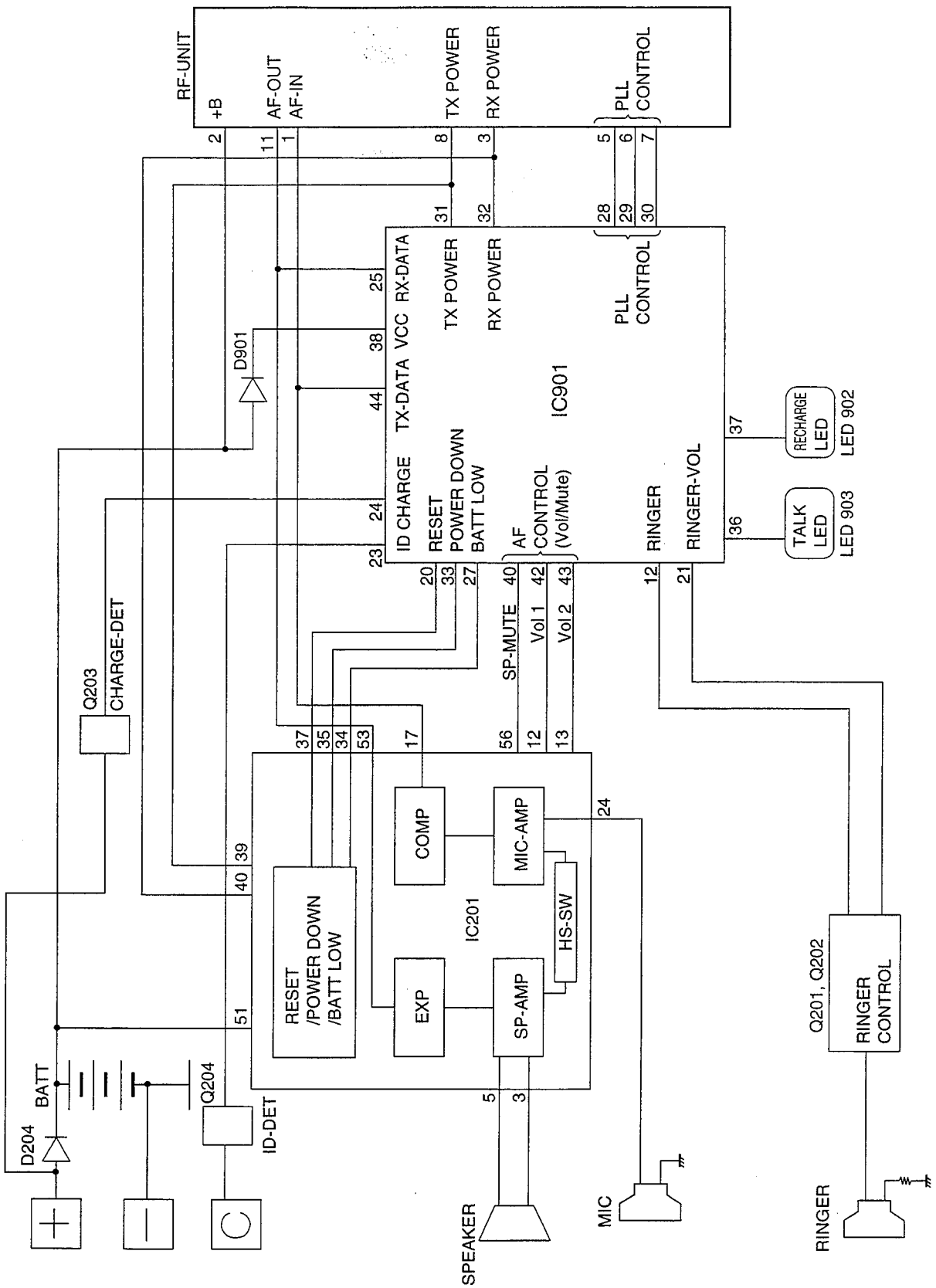


19.9. ID Code Setting

When the Handset is placed on the base unit, new ID data is output from pin 10 of the CPU after the charge detector operates. After passing through data amplifier Q351 and the charge terminal, the data is sent to the Handset.

20 BLOCK DIAGRAM (Handset)

20.1. Control Block

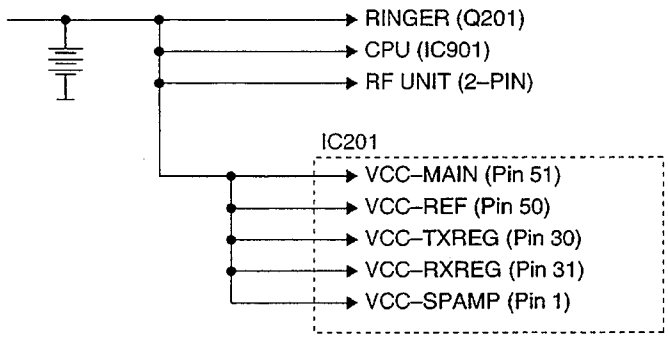


21 NEW CIRCUIT OPERATION (Handset)

21.1. Power Supply Circuit

Voltage is supplied separately to each block.

Circuit Diagram

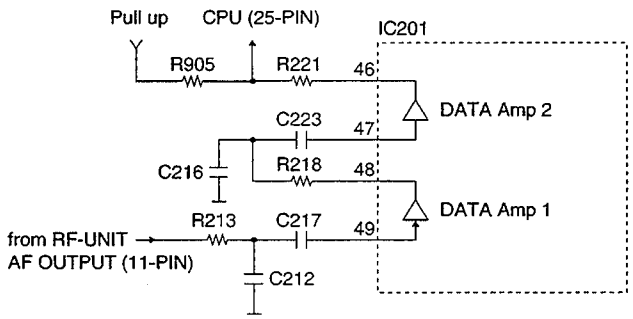


21.2. Data Reception Circuit

The wave detection signal from the RF UNIT has high frequency elements eliminated by a CR filter consisting of R213 and C212. Then it is amplified by DATA Amp1 and, once again, high frequency elements are eliminated by R218 and C216. After this, the signal is amplified by DATA Amp2 and input to pin 25 of the CPU.

The data output waveform is a block pulse.

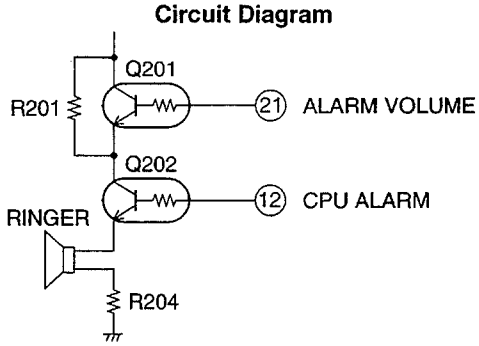
Circuit Diagram



21.3. Ringer Circuit

If the ringer volume is set to low and an alarm tone is output from pin 12 of the CPU and input to Q202. Then Q201 is turned off. If the ringer volume is set to high, Q201 turns on and results in a louder beep tone.

Circuit Diagram



21.4. Reception Signal Circuit

The receiver circuit comprises expander IC201.

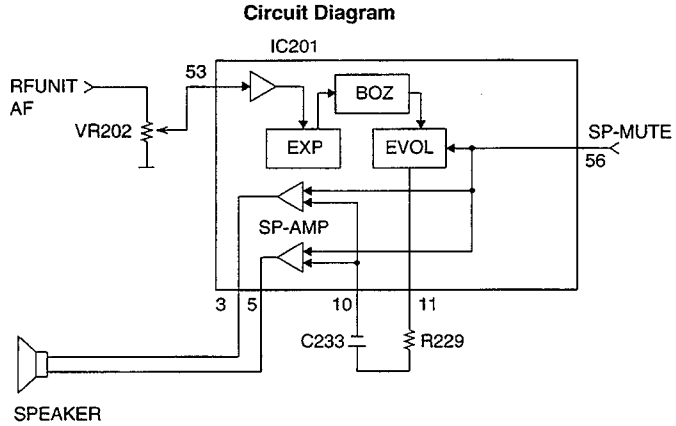
After being adjusted to the appropriate level by VR202, the signal passes through a 3 kHz LPF and an expander built into IC202. If a large input is input to the microphone, the gain control built into lowers the gain to reduce the output of the speaker amplifier. If there is no large input being input to the microphone, the amplifier in IC201 is set to standard gain.

Consequently, the sound of the received audio signal becomes fainter when the user is talking in a loud voice and the side tone level is lowered. When the user talks more softly, the received audio signal is audible at the standard level.

RX VOL	EV1 IC201 (12) pin	EV2 IC201 (13) pin
+7dB	H	L
0dB	L	H
-7dB	L	L

SP MUTE H: SPEAKER OFF
L: SPEAKER ON

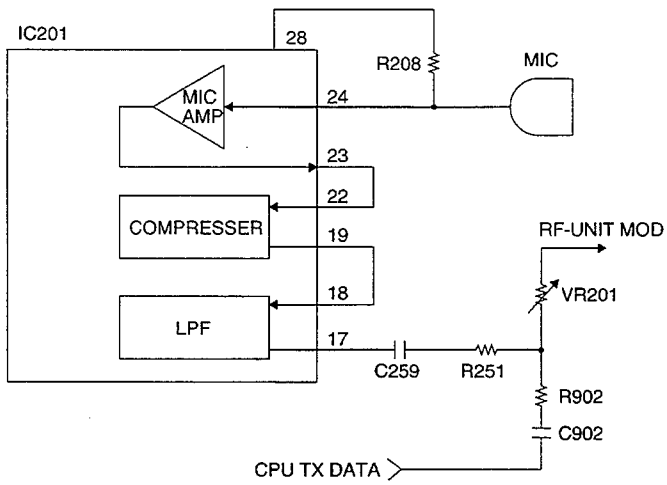
Circuit Diagram



21.5. Sending Signal

The audio signal from the microphone is amplified by Mic Amp, compander, and 3 kHz LPF built into IC201. It is then mixed with the TX DATA signal from the CPU, the modulation is adjusted by VR201, and input to the modulator in the RF UNIT.

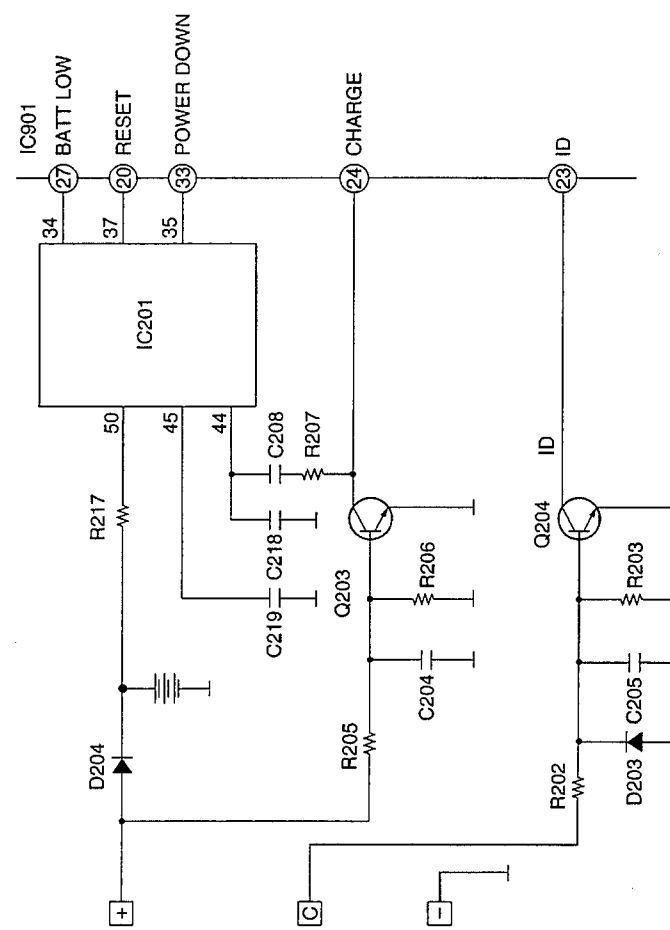
Circuit Diagram



21.6. Reset/Power Down/Battery Low/ID

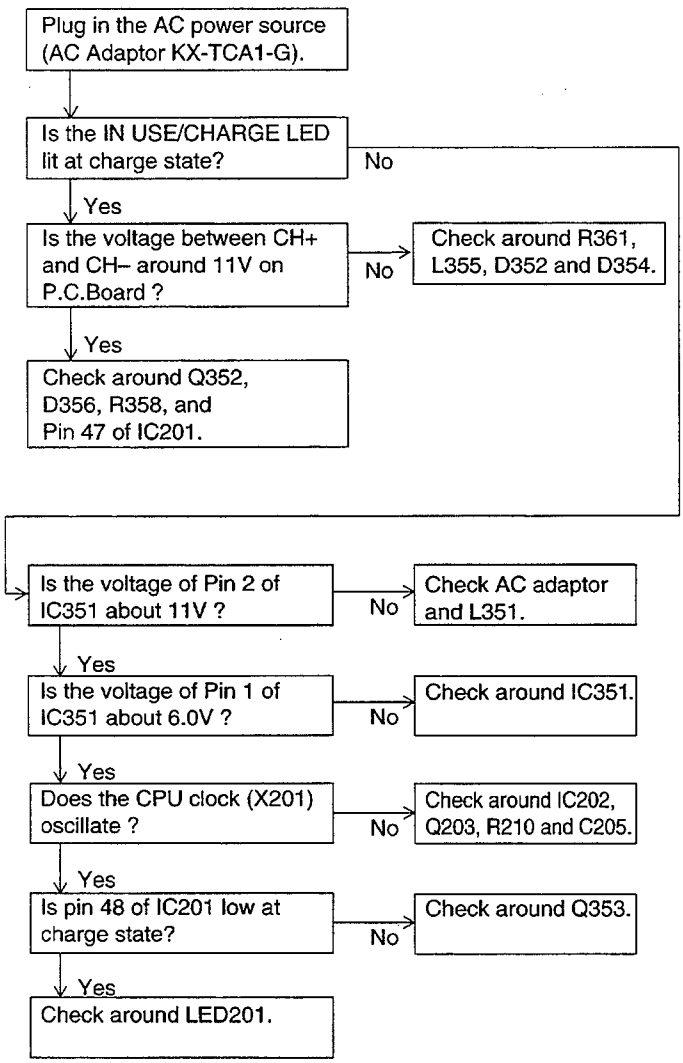
When the battery is installed in the Handset, the reset circuit consisting of R217 and inside IC201 functions, inputting a reset signal to the CPU. This ensures that the unit will operate normally without the user's needing to switch the power off and on. When the voltage from the batteries drops to 3.5 V, 3.5 V voltage detector inside IC201 operates and output a battery low signal to the CPU. This causes the RECHARGE LED to turn on. If voltage continues to drop and reaches 3.2 V, 3.2 V voltage detector inside IC201 operates and outputs a power down signal to the CPU. This causes power to be cut off automatically and prevents the battery from over discharging.
Q203 is a charge detector that informs the CPU whether or not the handset is currently being charged. During charging, ID data is sent from the base unit. Q204 receives this ID data and sends it to the CPU.

Circuit Diagram

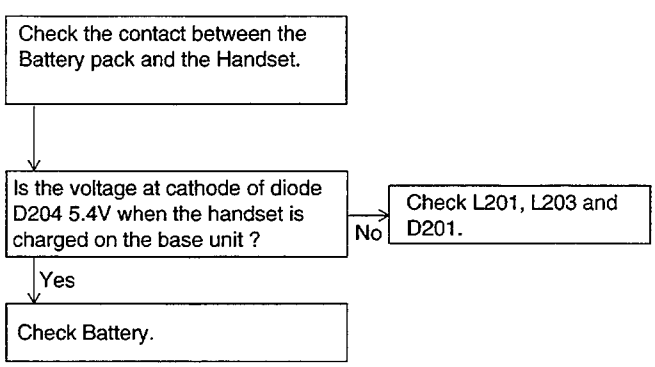


22 TROUBLESHOOTING GUIDE

22.1. Battery won't Charge (Base Unit)

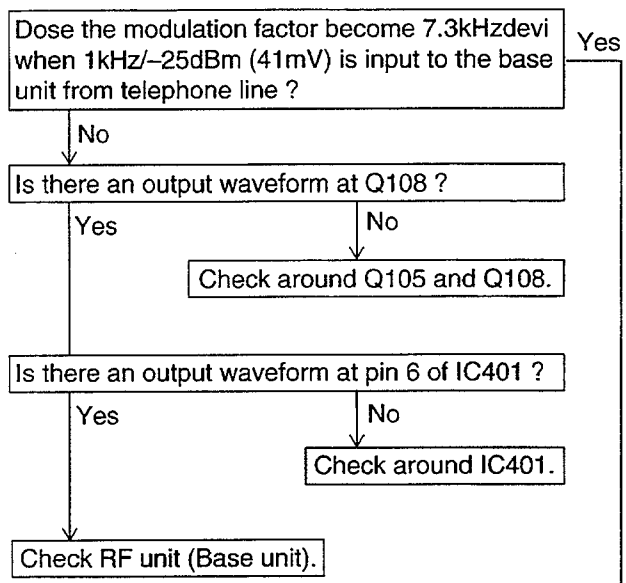

Plug in the AC power source (AC Adaptor KX-TCA1-G).
Is the IN USE/CHARGE LED lit at charge state?
No
Yes
Is the voltage between CH+ and CH– around 11V on P.C.Board ?
No
Check around R361, L355, D352 and D354.
Yes
Check around Q352, D356, R358, and Pin 47 of IC201.
Is the voltage of Pin 2 of IC351 about 11V ?
No
Check AC adaptor and L351.
Yes
Is the voltage of Pin 1 of IC351 about 6.0V ?
No
Check around IC351.
Yes
Does the CPU clock (X201) oscillate ?
No
Check around IC202, Q203, R210 and C205.
Yes
Is pin 48 of IC201 low at charge state?
No
Check around Q353.
Yes
Check around LED201.

22.2. Battery won't Charge (Handset)

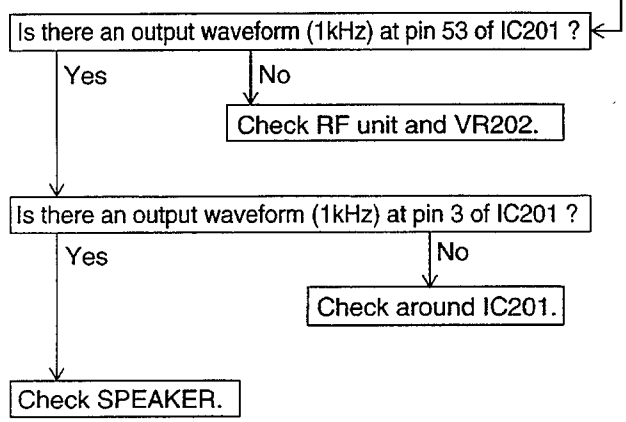

Check the contact between the Battery pack and the Handset.
Is the voltage at cathode of diode D204 5.4V when the handset is charged on the base unit ?
No
Check L201, L203 and D201.
Yes
Check Battery.

22.3. No Voice Reception

BASE UNIT


Dose the modulation factor become 7.3kHzdevi when 1kHz/–25dBm (41mV) is input to the base unit from telephone line ?
Yes
No
Is there an output waveform at Q108 ?
Yes
No
Check around Q105 and Q108.
Is there an output waveform at pin 6 of IC401 ?
Yes
No
Check around IC401.
Check RF unit (Base unit).

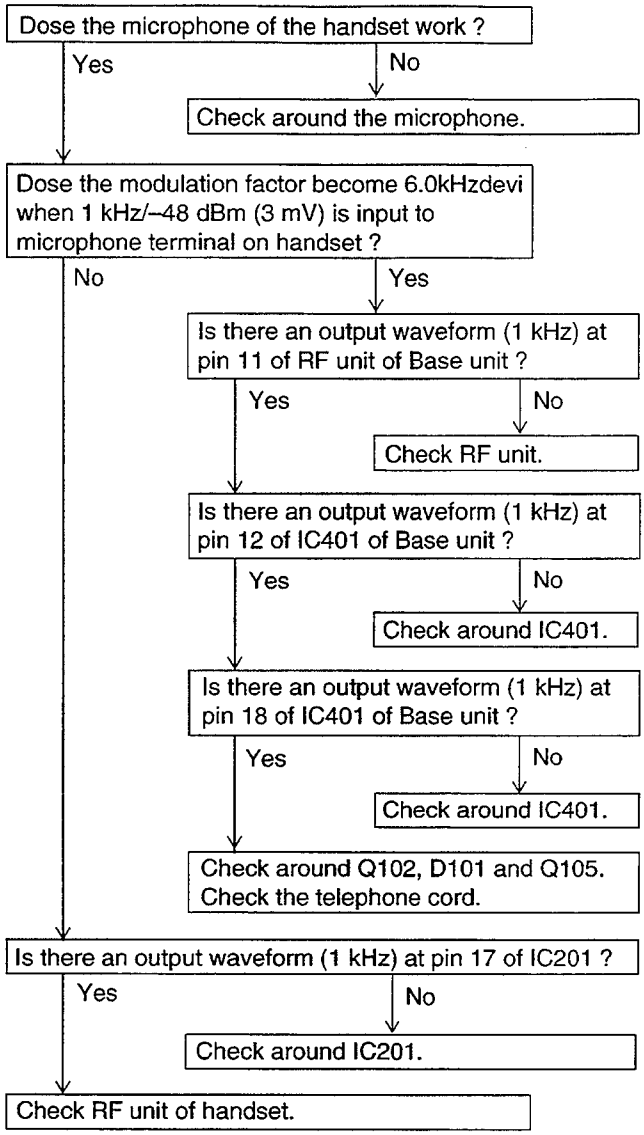
HANDSET


Is there an output waveform (1kHz) at pin 53 of IC201 ?
Yes
No
Check RF unit and VR202.
Is there an output waveform (1kHz) at pin 3 of IC201 ?
Yes
No
Check around IC201.
Check SPEAKER.

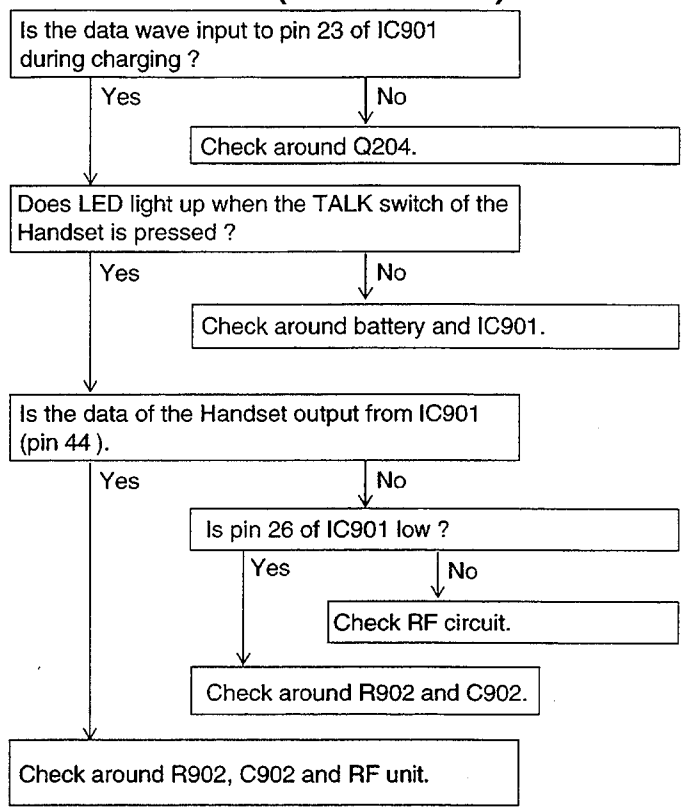
Note:

When checking the RF UNIT, refer to **7. HOW TO CHECK THE RF UNIT.**

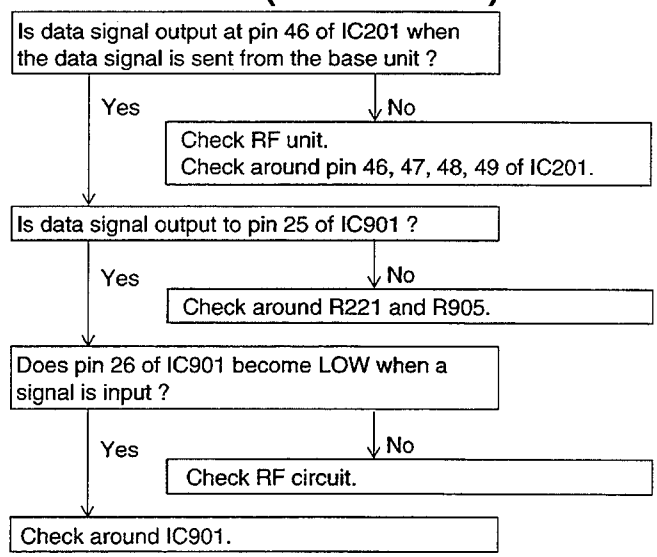
22.4. No Voice Transmission


Dose the microphone of the handset work ?
Yes
No
Check around the microphone.
Dose the modulation factor become 6.0kHzdevi when 1 kHz/–48 dBm (3 mV) is input to microphone terminal on handset ?
No
Yes
Is there an output waveform (1 kHz) at pin 11 of RF unit of Base unit ?
Yes
No
Check RF unit.
Is there an output waveform (1 kHz) at pin 12 of IC401 of Base unit ?
Yes
No
Check around IC401.
Is there an output waveform (1 kHz) at pin 18 of IC401 of Base unit ?
Yes
No
Check around IC401.
Check around Q102, D101 and Q105. Check the telephone cord.
Is there an output waveform (1 kHz) at pin 17 of IC201 ?
Yes
No
Check around IC201.
Check RF unit of handset.

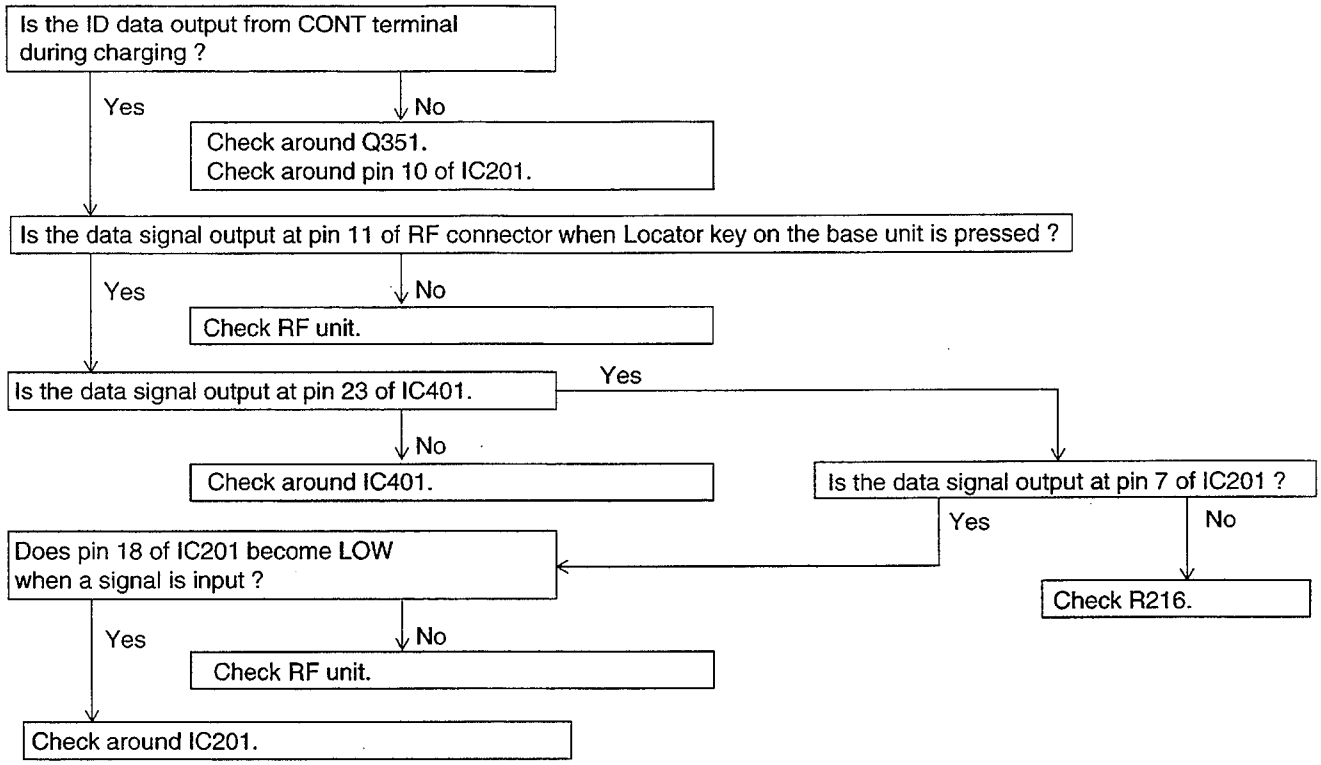
22.5. No Link (Handset TX)


Is the data wave input to pin 23 of IC901 during charging ?
Yes
No
Check around Q204.
Does LED light up when the TALK switch of the Handset is pressed ?
Yes
No
Check around battery and IC901.
Is the data of the Handset output from IC901 (pin 44).
Yes
No
Is pin 26 of IC901 low ?
Yes
No
Check RF circuit.
Check around R902 and C902.
Check around R902, C902 and RF unit.

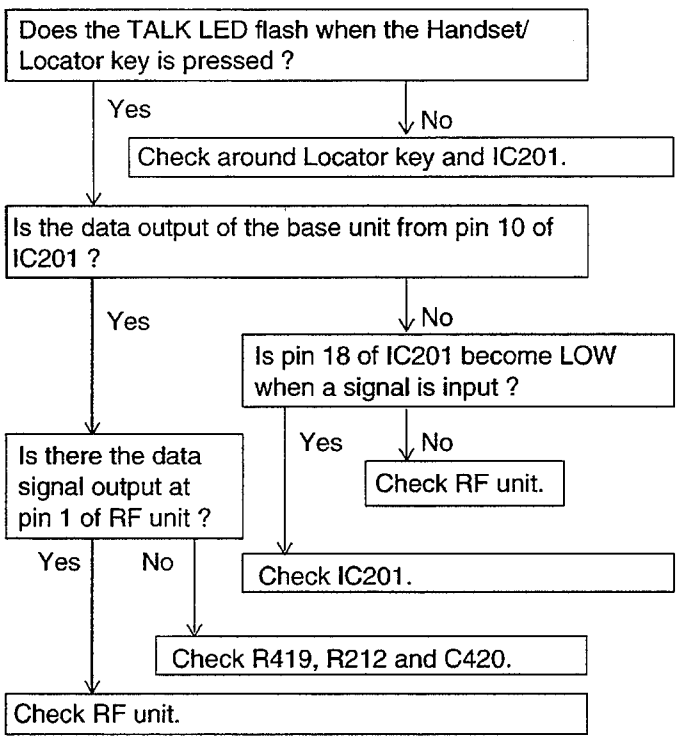
22.6. No Link (Handset RX)


Is data signal output at pin 46 of IC201 when the data signal is sent from the base unit ?
Yes
No
Check RF unit.
Check around pin 46, 47, 48, 49 of IC201.
Is data signal output to pin 25 of IC901 ?
Yes
No
Check around R221 and R905.
Does pin 26 of IC901 become LOW when a signal is input ?
Yes
No
Check RF circuit.
Check around IC901.

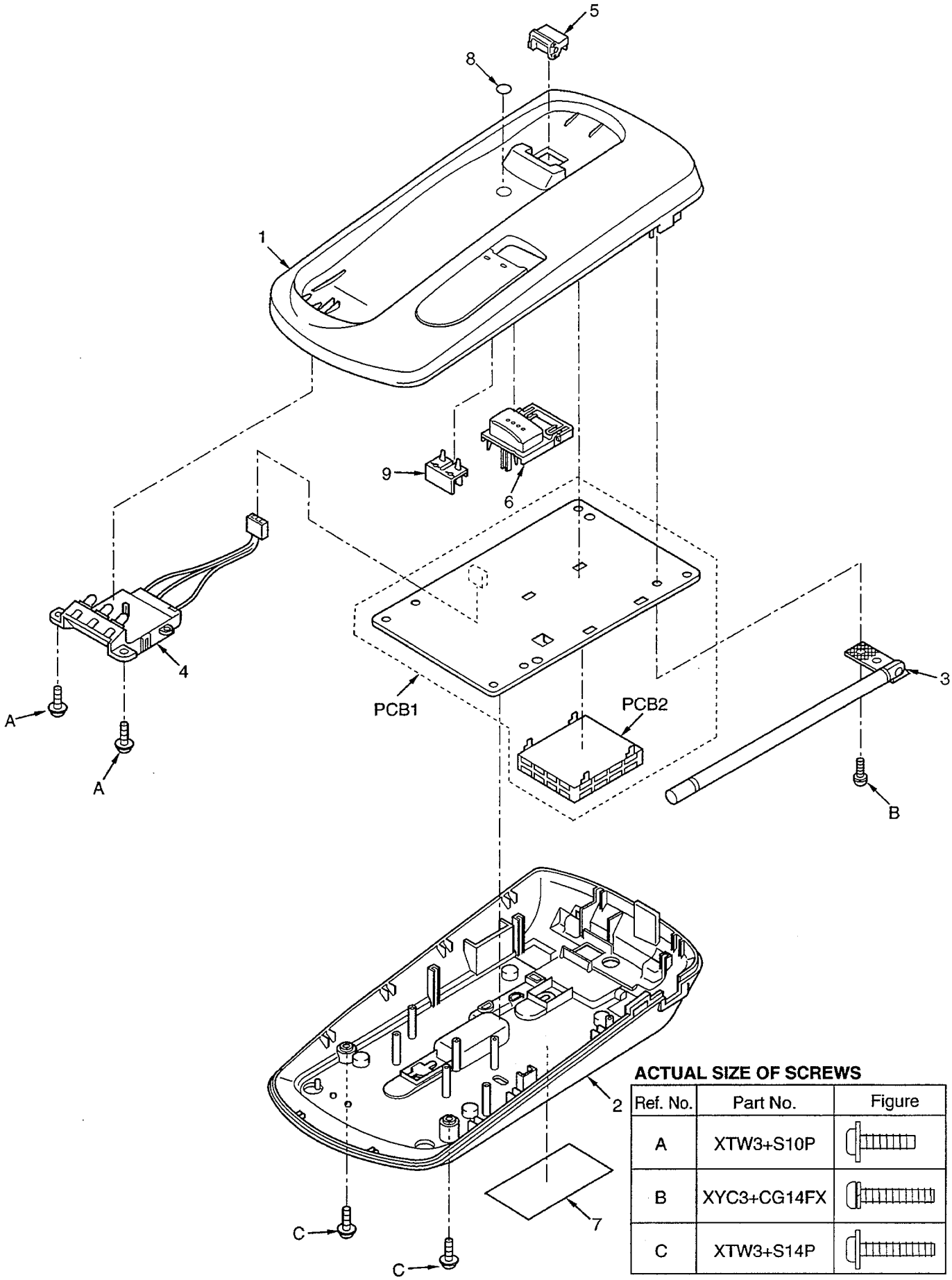
22.7. No Link (Base Unit RX)


Is the ID data output from CONT terminal during charging ?
Yes
No
Check around Q351.
Check around pin 10 of IC201.
Is the data signal output at pin 11 of RF connector when Locator key on the base unit is pressed ?
Yes
No
Check RF unit.
Is the data signal output at pin 23 of IC401.
Yes
No
Check around IC401.
Is the data signal output at pin 7 of IC201 ?
Yes
No
Check R216.
Does pin 18 of IC201 become LOW when a signal is input ?
Yes
No
Check RF unit.
Check around IC201.

22.8. No Link (Base Unit TX)


Does the TALK LED flash when the Handset/ Locator key is pressed ?
Yes
No
Check around Locator key and IC201.
Is the data output of the base unit from pin 10 of IC201 ?
Yes
No
Is pin 18 of IC201 become LOW when a signal is input ?
Yes
No
Check RF unit.
Is there the data signal output at pin 1 of RF unit ?
Yes
No
Check IC201.
Check R419, R212 and C420.
Check RF unit.

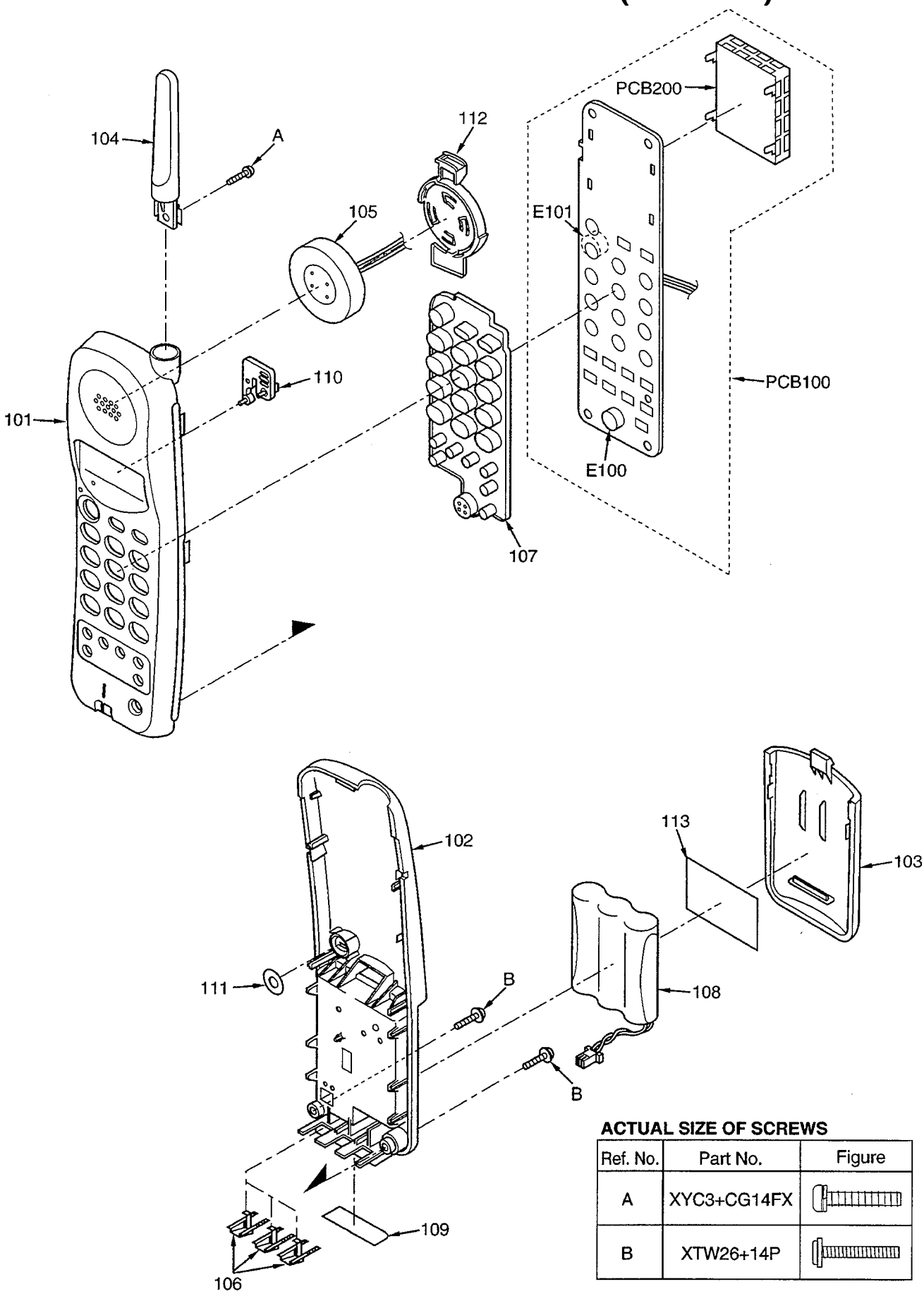
23 CABINET AND ELECTRICAL PARTS (Base Unit)



ACTUAL SIZE OF SCREWS

Ref. No.	Part No.	Figure
A	XTW3+S10P	
B	XYC3+CG14FX	
C	XTW3+S14P	

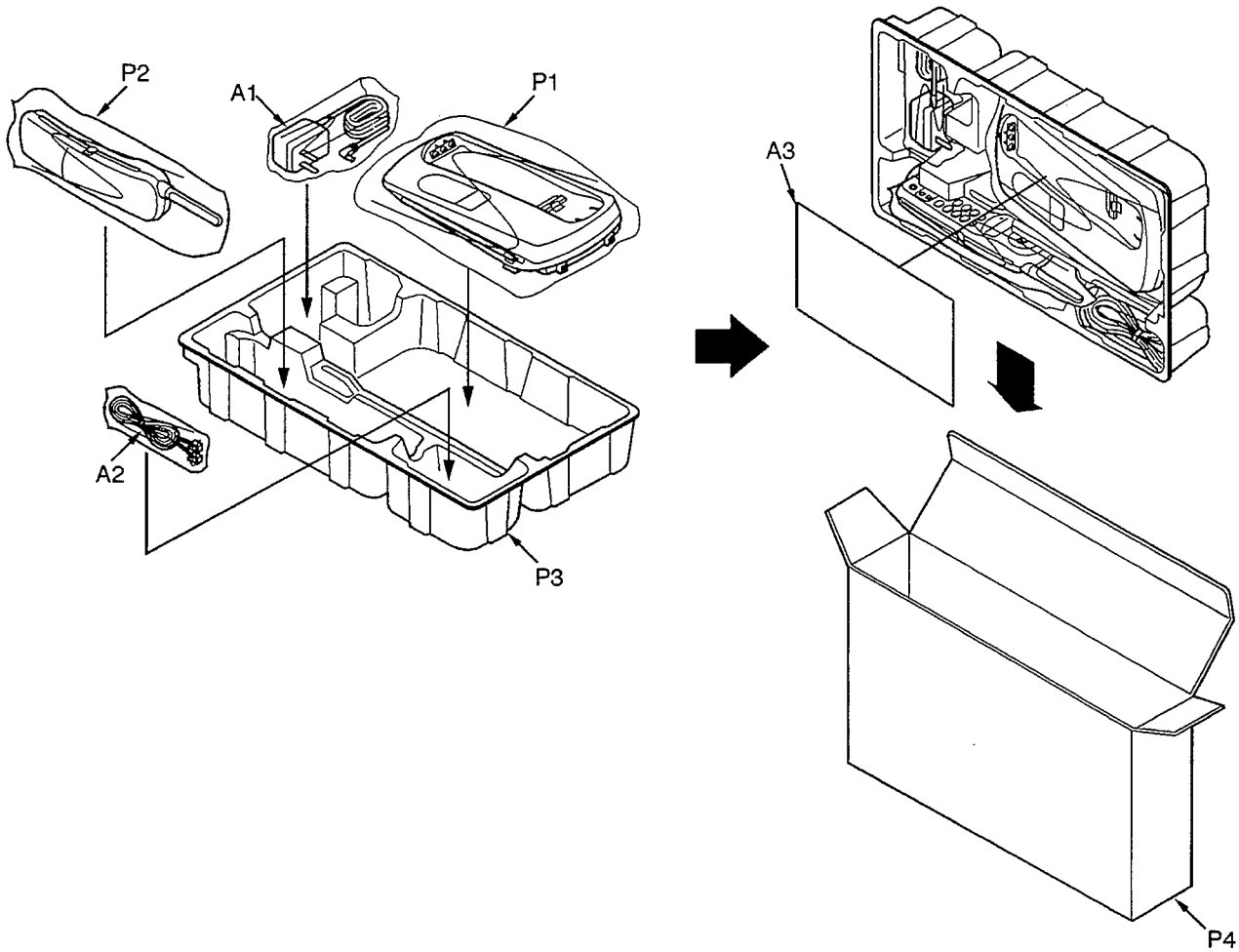
24 CABINET AND ELECTRICAL PARTS (Handset)



ACTUAL SIZE OF SCREWS

Ref. No.	Part No.	Figure
A	XYC3+CG14FX	
B	XTW26+14P	

25 ACCESSORIES AND PACKING MATERIALS



26 REPLACEMENT PARTS LIST

This replacement parts list are U.S.A. version only. Refer to the simplified manual (cover) for other areas.

Note:

1. RTL (Retention Time Limited)

   The marking (RTL) indicates that the Retention Time is limited for this item.

   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention.

   After the end of this period, the assembly will no longer be available.

2. Important safety notice

   Components identified by a ⚠ mark special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.

3. The S mark indicates service standard parts and may differ from production parts.

4. RESISTORS & CAPACITORS

   Unless otherwise specified;

   All resistors are in ohms (Ω) K=1000Ω, M=1000kΩ

   All capacitors are in MICRO FARADS (μF) P=μμF

   *Type & Wattage of Resistor

Type

ERC:Solid ERD:Carbon PQRD:Carbon	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Carbon ERS:Fusible Resistor ERF:Cement Resistor

Wattege

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol PQCUV:Chip ECQMS:Mica	ECCD,ECKD,ECBT,PQCBC:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECSZ:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :63V 2A :100V

26.1. Base Unit

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND ELECTRICAL PARTS	
1	PQKM10362Z1	UPPER CABINET	
		(FOR KX-TC1400B)	
1	PQKM10362Z2	UPPER CABINET	
		(FOR KX-TC1400W)	
2	PQKF10273R1	LOWER CABINET	
		(FOR KX-TC1400B)	
2	PQKF10273R2	LOWER CABINET	
		(FOR KX-TC1400W)	
3	PQSA10080Y	ANTENNA (KX-TC1400B)	
3	PQSA10080Z	ANTENNA (KX-TC1400W)	
4	PQJT10151Y	CHARGE TERMINAL	
5	PQKE10082Z1	HANGER (KX-TC1400B)	S
5	PQKE10082Z2	HANGER (KX-TC1400W)	S
6	PQBC10268Z1	BUTTON (KX-TC1400B)	S
6	PQBC10268Z2	BUTTON (KX-TC1400W)	S
7	PQGT13560Z	NAME PLATE (KX-TC1400B)	
7	PQGT13562Z	NAME PLATE (KX-TC1400W)	
8	PQGX10011Z1	ORNAMENT (KX-TC1400B)	
8	PQGX10011Z2	ORNAMENT (KX-TC1400W)	
9	PQHR10637Z	SPACER	
		MAIN P.C.BOARD PARTS	
PCB1	PQWPTC1400BH	P.C.BOARD ASS'Y (RTL)	
		ICS	
IC201	MN150832BB1	IC	
IC202	PQVIPST994CT	IC	
IC351	PQVIL7806D2T	IC	
IC401	AN6137SB	IC	
		TRANSISTORS	
Q101	2SC4116	TRANSISTOR(SI)	
Q102	2SA1625	TRANSISTOR(SI)	
Q103	PQVT2N6517CA	TRANSISTOR(SI)	
Q105	2SC2120	TRANSISTOR(SI)	
Q108	2SD601R	TRANSISTOR(SI)	
Q203	2SD601R	TRANSISTOR(SI)	
Q351	2SD1991A	TRANSISTOR(SI)	
Q352	2SD1994A	TRANSISTOR(SI)	
Q353	2SD601R	TRANSISTOR(SI)	
		DIODES	
D101	PQVDS1ZB40F1	DIODE(SI)	S
D102	MA4180	DIODE(SI)	
D103	MA110	DIODE(SI)	
D104	MA110	DIODE(SI)	
D201	MA110	DIODE(SI)	
D204	MA110	DIODE(SI)	
D205	MA110	DIODE(SI)	
D352	MA4300	DIODE(SI)	
D353	MA4300	DIODE(SI)	
D354	MA4300	DIODE(SI)	
D357	MA8220	DIODE(SI)	
D359	MA8220	DIODE(SI)	
D360	MA8220	DIODE(SI)	
D380	MA8220	DIODE(SI)	
D500	MA4300	DIODE(SI)	
D801	1SS133	DIODE(SI)	
D802	1SS133	DIODE(SI)	
D803	1SS133	DIODE(SI)	
LED201	PQVDPY1112H	LED	
		COILS	
L101	PQLQXF330K	COIL	
L102	PQLQXF330K	COIL	
L351	PQLQXF100K	COIL	
L354	PQLQZM330K	COIL	
L355	PQLQZM3R3K	COIL	
L801	PQLQR2M3N3K	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
		SURGE ABSORBERS	
SA101	PQVDDSS301L	SURGE ABSORBER	
SA102	PQVDDSS301L	SURGE ABSORBER	
		VARIABLE RESISTORS	
VR401	EVN5ESX50B54	VARIABLE RESISTOR	
VR402	EVN5ESX50B24	VARIABLE RESISTOR	
		SWITCH	
S201	EVQPC005K	SWITCH	
		CRYSTAL OSCILLATOR	
X201	PQVBKBR3.58M	CRYSTAL OSCILLATOR	
		POSISTOR	
P101	PQRPAR390N	THERMISTOR	S
		CONNECTOR	
CN352	PQJP03B70Z	CONNECTOR	
		JACK	
CN101	PQJJ2H003Z	JACK, TEL/DC IN	
		RESISTORS	
R101	PQ4R10XJ155	1.5M	
R102	PQ4R10XJ155	1.5M	
R103	PQ4R10XJ563	56K	
R104	PQ4R10XJ473	47K	
R105	ERDS2TJ104	100K	
R106	ERDS2TJ472	4.7K	
R107	PQ4R10XJ104	100K	
R108	PQ4R10XJ472	4.7K	
R115	PQ4R10XJ222	2.2K	
R116	PQ4R10XJ393	39K	
R117	ERDS1TJ330	33	S
R118	PQ4R10XJ152	1.5K	
R119	PQ4R10XJ332	3.3K	
R120	PQ4R10XJ470	47	
R132	ERJ3GEYJ123	12K	
R133	PQ4R10XJ472	4.7K	
R134	ERJ3GEYJ224	220K	
R135	ERJ3GEYJ561	560	
R136	ERJ3GEYJ472	4.7K	
R137	ERJ3GEYJ100	10	
R205	ERJ3GEYJ101	100	
R206	ERJ3GEYJ101	100	
R207	ERJ3GEYJ102	1K	
R208	ERJ3GEYJ104	100K	
R209	ERJ3GEYJ104	100K	
R210	ERJ3GEYJ102	1K	
R212	PQ4R10XJ473	47K	
R213	ERJ3GEYJ471	470	
R214	ERJ3GEYJ103	10K	
R215	ERJ3GEYJ104	100K	
R216	ERJ3GEYJ154	150K	
R217	ERJ3GEYJ103	10K	
R218	ERJ3GEYJ103	10K	
R219	ERJ3GEYJ222	2.2K	
R222	ERJ3GEYJ104	100K	
R223	PQ4R10XJ104	100K	
R229	ERJ3GEYJ104	100K	
R233	ERJ3GEYJ102	1K	
R234	ERJ3GEYJ102	1K	
R235	ERJ3GEYJ102	1K	
R351	PQ4R10XJ473	47K	
R352	ERDS1TJ331	330	S

Ref. No.	Part No.	Part Name & Description	Remarks
R353	PQ4R10XJ180	18	
R358	PQ4R10XJ221	220	
R359	PQ4R10XJ473	47K	
R360	ERJ3GEYJ103	10K	
R361	ERDS1TJ100	10	S
R362	PQ4R10XJ104	100K	
R364	PQ4R10XJ681	680	
R407	ERJ3GEYJ823	82K	
R408	ERJ3GEYJ103	10K	
R409	ERJ3GEYJ472	4.7K	
R410	ERJ3GEYJ333	33K	
R411	ERJ3GEYJ333	33K	
R412	ERJ3GEYJ153	15K	
R413	ERJ3GEYJ333	33K	
R414	ERJ3GEYJ473	47K	
R415	ERJ3GEYJ223	22K	
R416	ERJ3GEYJ153	15K	
R417	ERJ3GEYJ153	15K	
R418	ERJ3GEYJ153	15K	
R419	ERJ3GEYJ104	100K	
R420	ERJ3GEYJ124	120K	
R421	ERJ3GEYJ683	68K	
R424	ERJ3GEYJ822	8.2K	
R429	PQ4R10XJ331	330	
R430	ERJ3GEYJ393	39K	
R508	ERJ3GEY0R00	0	
R801	ERD25VJ105	1M	
R803	ERJ3GEYJ103	10K	
R804	ERJ3GEYJ103	10K	
R805	ERJ3GEYJ103	10K	
R808	ERJ3GEYJ103	10K	
R902	ERJ3GEY0R00	0	
D203	ERJ3GEYJ102	1K	
C802	ERJ3GEY0R00	0	
		CAPACITORS	
C101	PQCUV1H183KB	0.018	
C102	PQCUV1H183KB	0.018	
C103	PQCUV1H102J	0.001	S
C104	ECKD2H681KB	680P	S
C105	ECKD2H681KB	680P	S
C106	PQCUV1E333MD	0.033	S
C107	PQCUV1H103ZF	0.01	
C112	ECEA1VKS100	10	S
C113	PQCUV1H101JC	100P	
C114	PQCUV1H103KB	0.01	
C115	ECEA1CKS100	10	S
C116	PQCUV1E683KB	0.068	
C121	PQCUV1E104MD	0.1	S
C123	PQCUV1E104MD	0.1	S
C124	ECEA1CKS100	10	S
C125	PQCUV1H103KB	0.01	
C201	ECEA0JU102	1000	
C202	PQCUV1E104MD	0.1	S
C203	PQCUV1C224KB	0.22	
C204	PQCUV1H102J	0.001	S
C205	PQCUV1E104MD	0.1	S
C206	ECEA0JU102	1000	
C207	PQCUV1E104MD	0.1	S
C208	ECUV1H390JCV	39P	
C209	ECUV1H390JCV	39P	
C211	ECUV1H472KBV	0.0047	
C220	PQCUV1H102J	0.001	S
C352	PQCUV1E104MD	0.1	S
C353	ECEA1CKS100	10	S
C354	ECUV1H102KBV	0.001	
C357	PQCUV1E104MD	0.1	S
C363	PQCUV1E104MD	0.1	S
C365	ECUV1H102KBV	0.001	
C401	PQCUV1H222KB	0.0022	
C402	PQCUV1E104MD	0.1	S
C404	PQCUV1E104MD	0.1	S

Ref. No.	Part No.	Part Name & Description	Remarks
C405	ECEA1CKS220	22	S
C406	ECEA1CKS220	22	S
C407	PQCUV1E104MD	0.1	S
C408	ECEA1AU101	100	
C409	PQCUV1E104MD	0.1	S
C410	PQCUV1E333MD	0.033	S
C411	PQCUV1E104MD	0.1	S
C412	ECEA1VKS4R7	4.7	S
C413	ECUV1H122KBV	0.0012	
C414	ECUV1H152KBV	0.0015	
C415	ECEA1HKS2R2	2.2	S
C416	ECUV1H182KBV	0.0018	
C417	ECUV1H682KBV	0.0068	
C418	ECEA1VKS4R7	4.7	S
C419	PQCUV1E104MD	0.1	S
C420	PQCUV1E683KB	0.068	
C421	PQCUV1H222KB	0.0022	
C422	PQCUV1H103KB	0.01	
C423	ECUV1H332KBV	0.0033	
C424	ECUV1H682KBV	0.0068	
C425	PQCUV1C105ZF	1	
C429	PQCUV1E333MD	0.033	S
C801	ECKDRS102MB	0.001	⚠
C804	ECUV1H101JCV	100P	
C806	ECUV1H101JCV	100P	
C807	ECUV1H101JCV	100P	
C809	PQCUV1E104MD	0.1	S
		RF UNIT PARTS	
PCB2	PQLZ10006Z	P.C.BOARD ASS'Y (RTL)	

26.2. Handset

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND ELECTRICAL PARTS	
101	PQKM10367Z1	FRONT CABINET	
		(FOR KX-TC1400B)	
101	PQKM10367Z2	FRONT CABINET	
		(FOR KX-TC1400W)	
102	PQKF10278R1	CABINET COVER	
		(FOR KX-TC1400B)	
102	PQKF10278R2	CABINET COVER	
		(FOR KX-TC1400W)	
103	PQKK10089Z1	BATTERY COVER	S
		(FOR KX-TC1400B)	
103	PQKK10089Z2	BATTERY COVER	S
		(FOR KX-TC1400W)	
104	PQSA10083Z	ANTENNA (KX-TC1400B)	
104	PQSA10083Y	ANTENNA (KX-TC1400W)	
105	PQAX3P23Z	SPEAKER	
106	PQJT10150Z	CHARGE TERMINAL	
107	PQSX10092Z	KEYBOARD SWITCH	
		(KX-TC1400B)	
107	PQSX10092Y	KEYBOARD SWITCH	
		(KX-TC1400W)	
108	PQXA36SVC	BATTERY	S
109	PQGT13561Z	NAME PLATE (KX-TC1400B)	
109	PQGT13563Z	NAME PLATE (KX-TC1400W)	
110	PQHR10638Z	SPACER	
111	PQHG10527Z	SPACER	
112	PQHR10639Z	SP HOLDER	
113	PQHS10303Z	INSULATOR	
		MAIN P.C.BOARD PARTS	
PCB100	PQWPTC1400BR	P.C.BOARD ASS'Y (RTL)	

Ref. No.	Part No.	Part Name & Description	Remarks
		ICS	
IC201	AN6139FA	IC	
IC901	PQVI9046G014	IC	
		TRANSISTORS	
Q201	PQVTD123T146	TRANSISTOR(SI)	S
Q202	PQVTD123T146	TRANSISTOR(SI)	S
Q203	2SD1819A	TRANSISTOR(SI)	
Q204	2SD1819A	TRANSISTOR(SI)	
		DIODES	
D201	PQVDPTZTE25	DIODE(SI)	S
D202	MA8150	DIODE(SI)	
D203	MA111	DIODE(SI)	
D204	MA736	DIODE(SI)	
D212	MA111	DIODE(SI)	
D901	MA2ZD1400	DIODE(SI)	
LED902	PQVDBR1111C	DIODE(SI)	
LED903	PQVDSML310MT	DIODE(SI)	
		COILS	
L201	PQLQR3ER10K	COIL	
L202	PQLQR3ER10K	COIL	
L203	PQLQR3ER10K	COIL	
C269	MQLRE18NJF	COIL	
		VARIABLE RESISTORS	
VR201	EVN5ESX50B15	VARIABLE RESISTOR	
VR202	EVN5ESX50B54	VARIABLE RESISTOR	
		CRYSTAL OSCILLATORS	
X901	PQVCL3276N9Z	CRYSTAL OSCILLATOR	
X902	PQVBTCC3.99M	CERAMIC FILTER	
		OTHERS	
CHG(+)	PQJT10152Z	CHARGE TERMINAL	
CHG(-)	PQJT10152Z	CHARGE TERMINAL	
CHG(C)	PQJT10152Z	CHARGE TERMINAL	
CN202	PQJP2D13Z	CONNECTOR	
E100	PQJM122Z	MICROPHONE	
E101	PQEFBDB111GF	BUZZER	
		RESISTORS	
R201	ERJ3GEYJ221	220	
R202	ERJ3GEYJ332	3.3K	
R203	ERJ3GEYJ103	10K	
R204	ERJ3GEYJ120	12	
R205	ERJ3GEYJ393	39K	
R206	ERJ3GEYJ123	12K	
R207	ERJ3GEYJ104	100K	
R208	ERJ3GEYJ222	2.2K	
R209	ERJ3GEYJ563	56K	
R210	ERJ3GEYJ104	100K	
R211	ERJ3GEYJ153	15K	
R212	ERJ3GEY0R00	0	
R213	ERJ3GEYJ103	10K	
R214	ERJ3GEYJ100	10	
R215	ERJ3GEYJ153	15K	
R217	ERJ3GEYJ220	22	
R218	ERJ3GEYJ103	10K	
R219	ERJ3GEY0R00	0	
R220	ERJ3GEYJ103	10K	
R221	ERJ3GEYJ101	100	
R223	ERJ3GEYJ102	1K	
R224	ERJ3GEYJ333	33K	
R228	ERJ3GEYJ333	33K	

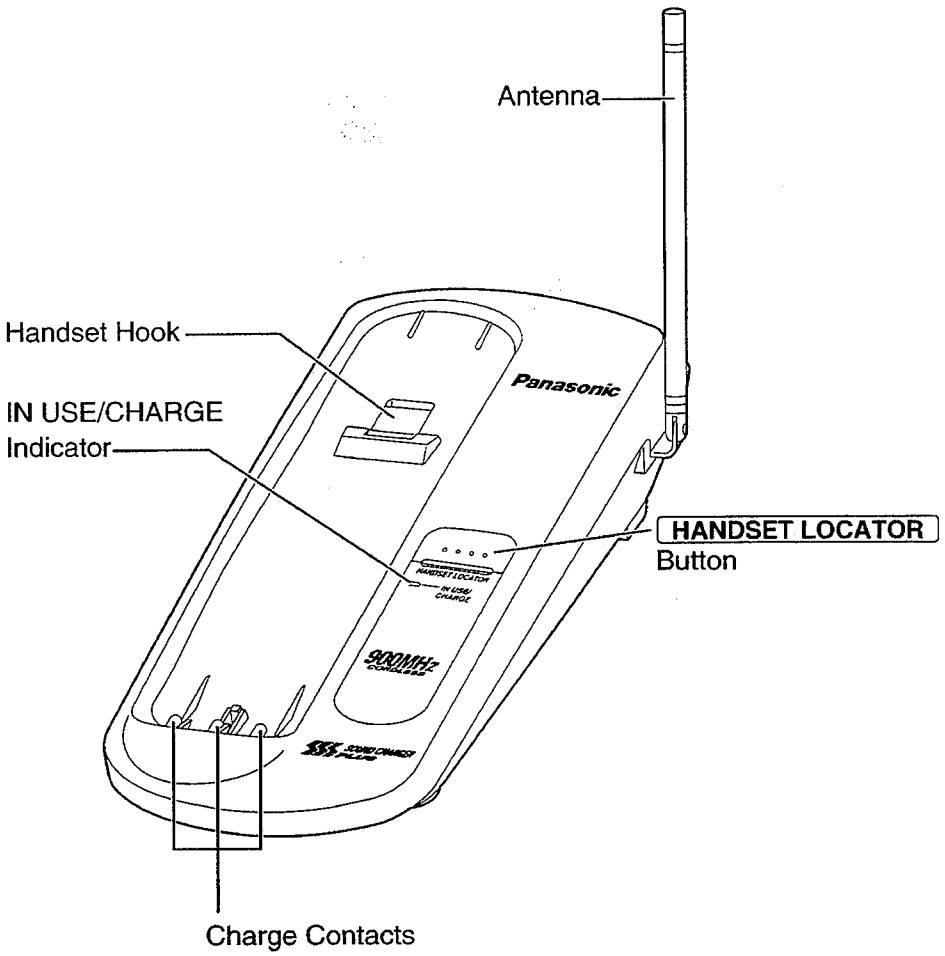
Ref. No.	Part No.	Part Name & Description	Remarks
R229	ERJ3GEY0R00	0	
R231	ERJ3GEYJ330	33	
R232	ERJ3GEYJ273	27K	
R233	ERJ3GEYJ273	27K	
R234	ERJ3GEYJ823	82K	
R235	ERJ3GEYJ104	100K	
R240	ERJ3GEYJ153	15K	
R241	ERJ3GEYJ222	2.2K	
R251	ERJ3GEYJ333	33K	
R254	ERJ3GEYJ222	2.2K	
R260	ERJ3GEYJ104	100K	
R271	ERJ3GEY0R00	0	
R272	ERJ3GEY0R00	0	
R274	ERJ3GEYJ103	10K	
R280	ERJ3GEY0R00	0	
R901	ERJ3GEYJ102	1K	
R902	ERJ3GEYJ334	330K	
R904	ERJ3GEYJ681	680	
R905	ERJ3GEYJ104	100K	
R906	ERJ3GEYJ331	330	
R908	ERJ3GEYJ105	1M	
R910	ERJ3GEYJ101	100	
R911	ERJ3GEYJ101	100	
R913	ERJ3GEYJ105	1M	
R914	ERJ3GEYJ102	1K	
R915	ERJ3GEYJ102	1K	
R916	ERJ3GEYJ105	1M	
R919	ERJ3GEYJ100	10	
R920	ERJ3GEYJ101	100	
R921	ERJ3GEYJ102	1K	
R922	ERJ3GEYJ101	100	
		CAPACITORS	
C202	PQCUV1E104MD	0.1	S
C203	ECUV1H101JCV	100P	
C204	ECUV1H103KBV	0.01	
C205	ECUV1H103KBV	0.01	
C206	ECST0JY106	10	
C208	ECUV1H103KBV	0.01	
C209	ECEA1CKS470	47	S
C210	ECUV1C104KBV	0.1	
C212	ECUV1H103KBV	0.01	
C213	ECUV1C104KBV	0.1	
C214	ECUV1H472KBV	0.0047	
C216	ECUV1H103KBV	0.01	
C217	ECUV1C683KBV	0.068	
C218	ECUV1H103KBV	0.01	
C219	ECUV1H103KBV	0.01	
C220	ECUV1H182KBV	0.0018	
C221	ECUV1C104ZFV	0.1	
C223	ECUV1C683KBV	0.068	
C224	PQCUV1C474ZF	0.47	
C225	ECST0JY106	10	
C226	ECEA0JKA331	330	
C228	ECUV1H682KBV	0.0068	
C231	ECUV1C104KBV	0.1	
C232	PQCUV1C105ZF	1	
C233	ECUV1C104KBV	0.1	
C234	PQCUV1C105ZF	1	
C235	PQCUV1C105ZF	1	
C236	PQCUV1C474ZF	0.47	
C237	PQCUV1C105ZF	1	
C238	ECUV1H101JCV	100P	
C239	ECUV1C104ZFV	0.1	
C240	ECUV1H471JCV	470P	
C242	ECUV1C104ZFV	0.1	
C244	ECUV1H472KBV	0.0047	
C247	ECUV1C104KBV	0.1	
C251	ECUV1H822KBV	0.0082	
C259	ECUV1C104KBV	0.1	
C262	ECUV1C104ZFV	0.1	
C268	ECUV1H080DCV	8P	

Ref. No.	Part No.	Part Name & Description	Remarks
C270	ERJ3GEY0R00	0	
C271	ECUV1C104ZFV	0.1	
C901	ECUV1C104ZFV	0.1	
C902	ECUV1C104KBV	0.1	
C904	PQCUV1E104MD	0.1	S
C905	ECEA0JK221	220	S
C906	ECUV1H180JCV	18P	
C907	ECUV1H180JCV	18P	
		RF UNIT PARTS	
PCB200	PQLZ10005Z	P.C.BOARD ASS'Y (RTL)	

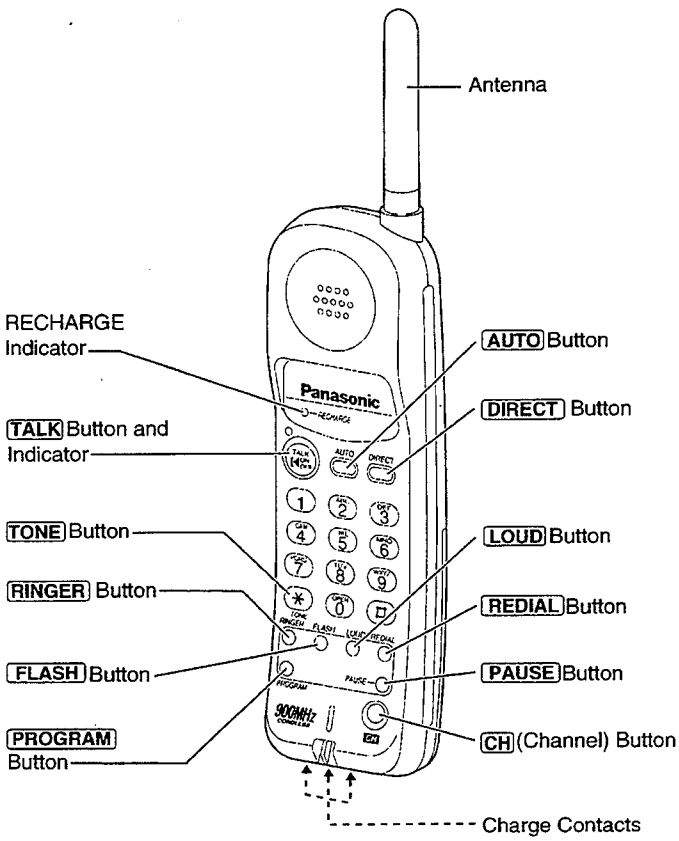
26.3. KX-TC1400B/KX-TC1400W

Ref. No.	Part No.	Part Name & Description	Remarks
		ACCESSORIES	
A1	KX-TCA1-G	AC ADAPTOR	
A2	PQJA10075Z	TEL CORD	
A3	PQQX12148Y	INSTRUCTION BOOK	
		PACKING MATERIALS	
P1	XZB20X35A01	PROTECTION COVER	
P2	XZB10X35A02	PROTECTION COVER	
P3	PQPN10664Z	CUSHION	
P4	PQPK12732Z	GIFT BOX (KX-TC1400B)	
P4	PQPK12755Z	GIFT BOX (KX-TC1400W)	

2 LOCATION OF CONTROLS

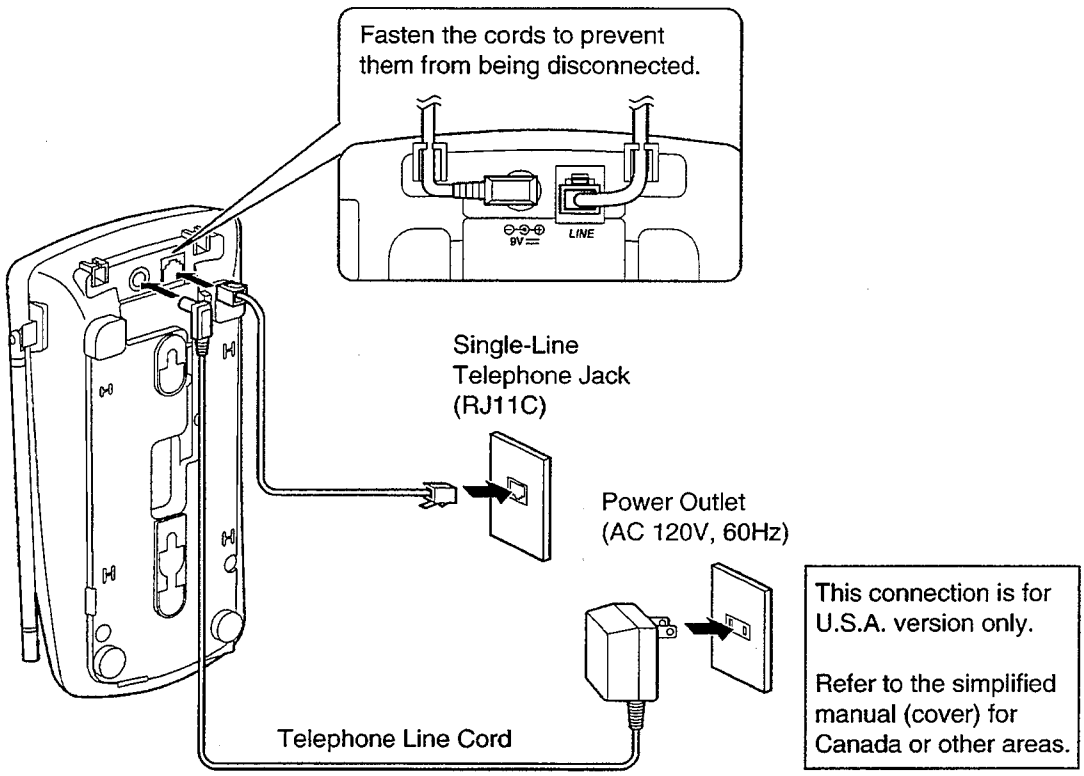


(Base Unit)



(Handset)

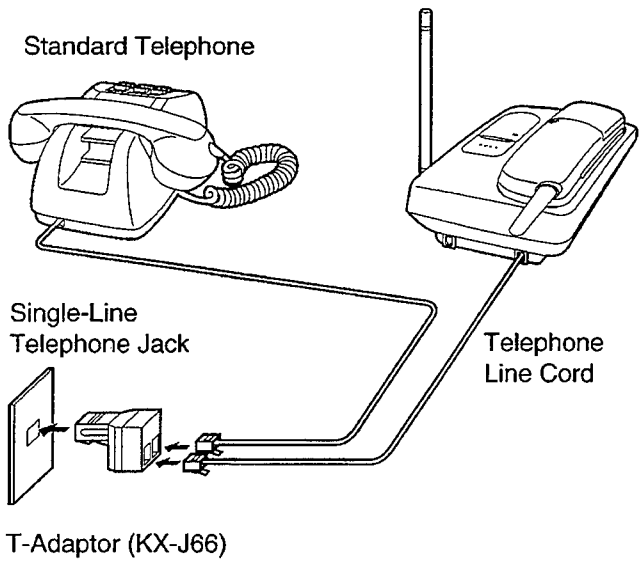
3 CONNECTION TO A TELEPHONE LINE


Fasten the cords to prevent them from being disconnected.
9V
LINE
Single-Line Telephone Jack (RJ11C)
Power Outlet (AC 120V, 60Hz)
This connection is for U.S.A. version only.
Refer to the simplified manual (cover) for Canada or other areas.
Telephone Line Cord

Note:

- USE ONLY WITH Panasonic AC ADAPTOR KX-TCA1-G.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)

3.1. Adding Another Phone



4 DISASSEMBLY INSTRUCTIONS

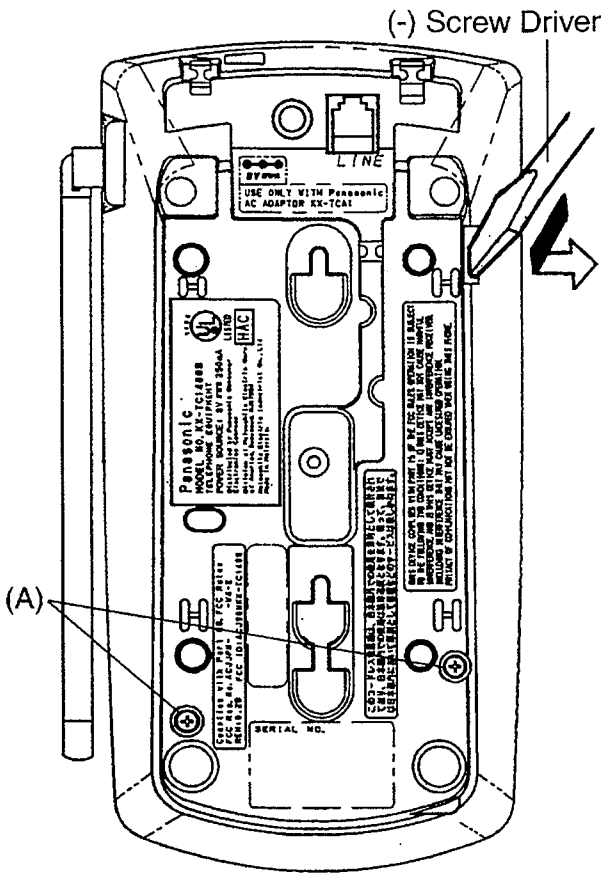
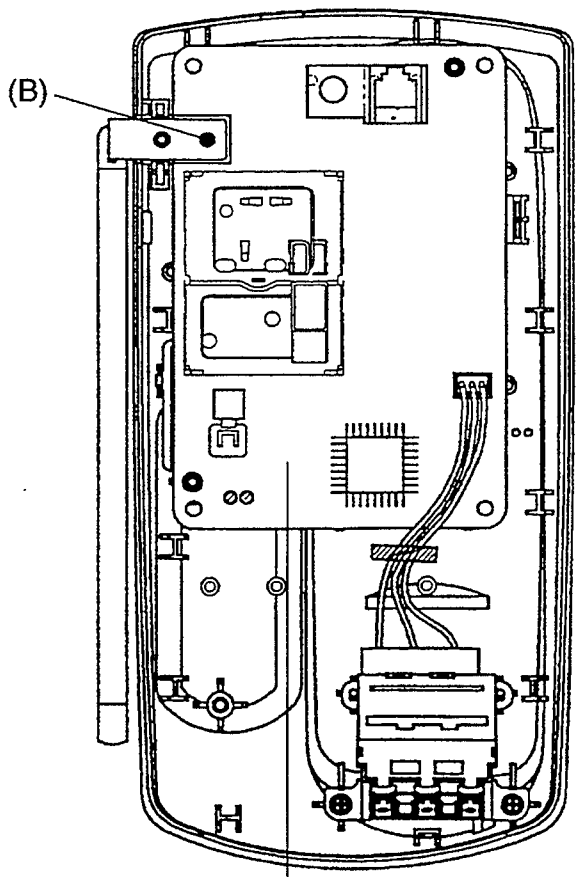


Fig. 1



Remove the P.C.Board Fig. 2

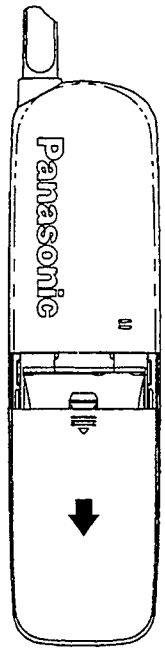


Fig. 3

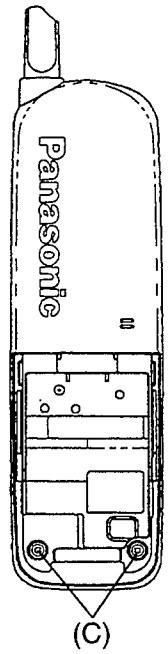


Fig. 4

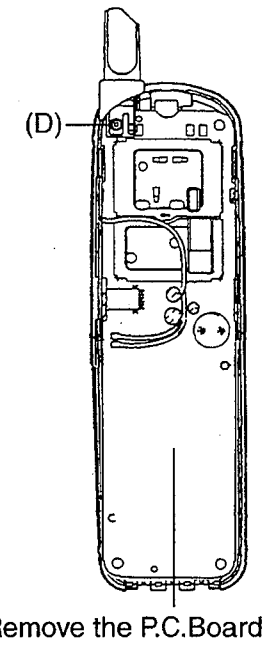


Fig. 5

Ref No.	Procedure	Shown in Fig.-	To Remove	Remove
1	1	1	Lower Cabinet	Screws (3 X 14) (A) X 2
2	1, 2	2	P.C. Board	Screw (3 X 14) (B) X 1
3	3	3	Battery Cover	Remove the Battery Cover
4	3, 4	4	Rear Cabinet	Screws (2.6 X 14) (C) X 2
5	3~5	5	P.C. Board	Screw (3 X 14) (D) X 1

Note:

When removing lower cabinet of Base Unit, remove screws (A) as shown Fig. 1. After that, insert (-) screw driver to a hole, and detach hook inside cabinet pressing screw driver in the direction of arrow.

5 ADJUSTMENT

5.1. Objective

This procedure will enable the technician to make adjustments to the KX-TC1400B/KX-TC1400W HANDSET and BASE UNIT.

5.2. General Information

This procedure has 2 sections. The first section instructs the technician on how to align the HANDSET. We recommend aligning the HANDSET first, since you will need the HANDSET to align the BASE UNIT. The second section aligns the BASE UNIT. You can use either section separately, or together to align the entire cordless phone unit.

At the beginning of each section, you will find a preparation procedure instructing you on how to prepare the unit to the point of placing the unit in TEST mode. Please follow this procedure to insure proper alignment.

Each section's procedure consists of Adjustment Items adjusting one specific variable hardware component.
Each Item lists the equipment needed, how to connect and setup the equipment, how to make the adjustment, and how to verify the adjustment if necessary.

Before the actual procedure, you will find a procedure detailing how to place that part in TEST mode. You will have to perform this procedure before each individual Adjustment Item.

Once aligned, please remove all equipment connections and solder points, and reassemble the unit. As a final check, power up the phone and check for HANDSET linking with the BASE UNIT.

5.3. Equipment

1. Radio Tester : Marconi Model 2295A or later.
2. 4.5 digit Digital Multimeter : B&K Model 2833 or compatible.
3. Oscilloscope, single or dual channel : Panasonic VP-5512P100 or compatible.
4. Telephone Analyzer : B&K Model 1050 or compatible.
5. DC Power Supply, capable of supply 3.9V DC at 100mA NOTE : only needed if Telephone Analyzer does not have DC VOLTS output available.
6. Corded Telephone.
7. High Frequency Cable : BNC end to open end.
8. Audio Cable : BNC end to alligator clip end.
9. High Frequency Adjustment Tool:
10. Isolation Capacitors, quantity of 2, 10 µF maximum, 50V DC or greater.
11. Soldering Iron, solder, and various tools.

5.4. Handset Preparation

Please perform the following steps to prepare the HANDSET for alignment. Please refer to the HANDSET REFERENCE DRAWING for connection and test point locations.

1. Remove battery cover and battery.
2. Remove both screws at the case bottom.
3. Grabbing hold of the back near the bottom, gently pry off the back of the case.
4. Remove the antenna mounting screw. Pull out the antenna.
5. Unsolder both speaker connections on P.C.Board.
6. Remove the HANDSET P.C.Board.
7. Remove the keypad membrane.
8. Solder High Frequency Cable open end to ANT and RF GND points.
9. Using the Digital Multimeter, measure DC VOLTS output on the Telephone Analyzer. Adjust the output voltage to 3.9V DC.
10. Solder battery connection wires at the points shown in the HANDSET REFERENCE DRAWING. Solder the positive lead to TP-V_{DD}, towards the component side of the P.C.Board. Solder the negative lead to the TP-V_{SS}. **DO NOT APPLY POWER TO THE HANDSET AT THIS TIME!!!!!!**
11. Solder a small, insulated piece of wire to **GND** as well.
12. Solder 1 isolation capacitor's positive lead to **SP+** test point. When soldering, keep the lead close to the P.C.Board as possible since you will lay the keypad membrane over part of this lead.
13. Solder a small, short, insulated wire to **MIC** test point.
14. Lay the keypad membrane over the keypad switch contacts.

5.5. Symptom/Remedy Table

If you have one of the listed symptoms, please refer to this table and make the appropriate adjustments.

SYMPTOM	REMEDY
Speaker level is unstable	Adjust Item (A).
Does not link with BASE UNIT	Adjust Items (B) and (C).
TX sound is unstable	Adjust Item (C) and (D).

5.6. Handset Adjustment Preparation

Please perform the following procedure before starting the Adjustment Procedure. You only have to perform this procedure only once to complete all Items, but you will have to perform this procedure to make an individual Adjustment Item.

1. You will need all equipment listed in the Item's EQUIPMENT section.
2. Setup all equipment as specified in the Item's PROCEDURE section SETUP portion.
3. Apply power to the HANDSET, and press TALK key.
4. Press 5, 8 and 0 keys at the same time.
5. You should hear the HANDSET beep. Release the 3 keys. If you do not hear a beep, remove the power from the HANDSET and repeat the last 2 steps.
6. Press the **TALK** key. HANDSET should now be in TEST MODE (CH 1 TALK). The TALK should be on. If the HANDSET is not in TEST MODE, remove the power and repeat the last 3 steps.
7. Remove the keypad membrane and lay it aside to prevent pressing some button by mistake during alignment.

5.7. Adjustment Procedure

ADJUSTMENT ITEM DESCRIPTION	(A) SP Output
EQUIPMENT	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 902.1000 MHz LEVEL 60 dB μ V SET MOD FREQ 1.000 kHz LEVEL 6.000 kHz High Frequency Cable to RF Connector. Audio Cable positive lead to isolation capacitor, negative lead to **GND**, BNC end to AF INPUT connector.
PROCEDURE	Adjust **VR202** until **AF VOLTS** equals **-32 dBV +/- 1 dB (-30dBm +/- 1dB)** Note This voltage reading is with no speaker or load attached to the HANDSET P.C.Board.

ADJUSTMENT ITEM DESCRIPTION	(B) RX sensitivity confirmation and squelch adjustment
EQUIPMENT	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 902.1000 MHz LEVEL 60 dB μ V SET MOD FREQ 1.000 kHz LEVEL 6.000 kHz High Frequency cable to RF Connector. Audio Cable positive lead to isolation capacitor, negative lead to **GND**, BNC end to AF INPUT connector. **Oscilloscope** SETUP X1 probe connected to INPUT 1. Probe ground connected to **GND**. TIME/DIV 1ms VOLT/DIV 1V Auto trigger
PROCEDURE	On Marconi, press SINAD until the display shows the SINAD value and press **dB**. Then press RF **GEN** and **LEVEL**. Lower RF **GEN LEVEL** at SINAD 12 dB and confirm that RF GEN LEVEL is less than **+1 dBµV (+7 dBµVem*f*)**. When level is more than +1 dBµV (+7 dBµVem*f*), change RF unit. Attach the oscilloscope probe to SQL test point. When RF GEN LEVEL is set at +5 dBµV (+11 dBµVem*f*), confirm that the signal of SQL TEST POINT is Low. After that, set RF GEN LEVEL at -17 dBµV (-11 dBµVem*f*), and confirm that the signal of SQL TEST POINT is High. When level is NG, change RF unit.

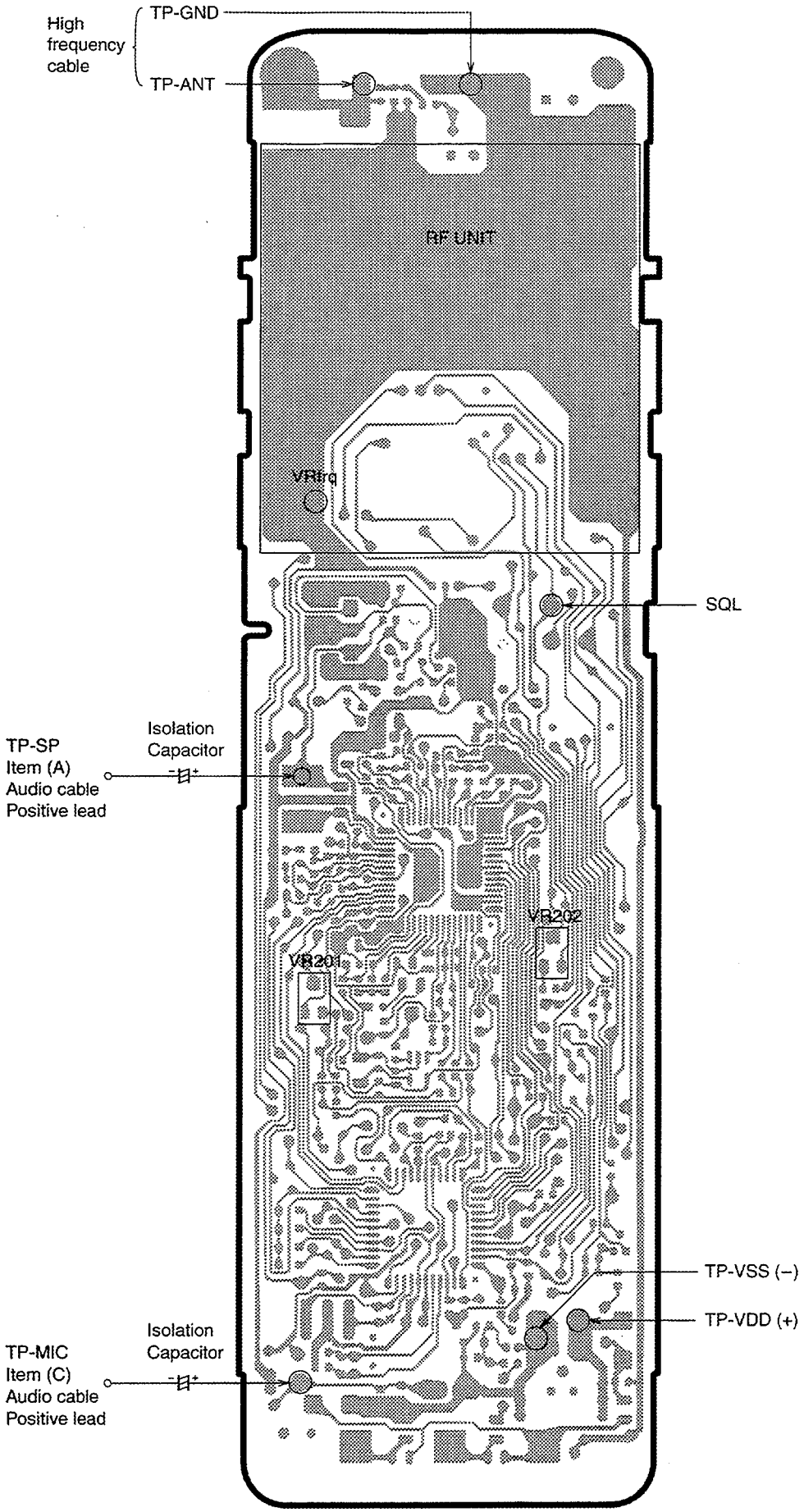
ADJUSTMENT ITEM DESCRIPTION	(C) MIC Input (MIC Modulation)
EQUIPMENT	**Marconi** SETUP Put in Transmitter Test mode. **AF GEN** **FREQ 1.000 KHz** **LEVEL -48 dBm (3mV) at 600 ΩLoad** Connect High Frequency Cable to RF connector. Connect Audio Cable positive lead to **MIC**, negative lead to **GND**, BNC end to AF GEN OUTPUT. Connect the isolation capacitor to positive lead side.
PROCEDURE	Adjust **VR201** until Marconi **MOD LEVEL** equals **6 kHz +/- 0.5 kHz.**

ADJUSTMENT ITEM DESCRIPTION	(D) Standard Frequency
EQUIPMENT	**Marconi** SETUP Put in Transmitter Test mode. **AF GEN** **FREQ 1.000 kHz** **LEVEL -48 dBm (3mV) at 600 ΩLoad** Connect High Frequency Cable to RF connector. Connect Audio Cable positive lead to **MIC**, negative lead to **GND**, BNC end to AF GEN OUTPUT.
PROCEDURE	Adjust **VRfrq** so that **926.100 MHz +/- 3kHz.** Note This Item's setup is exactly the same as Item (C). If you have done Item (C), simply look at TX FREQ and make the adjustment.

Once aligned, please perform the following procedure.

1. Disconnect all equipment and solder connections. Use solder wick to clean up any solder you added.
2. Install the keypad membrane on top of the HANDSET keys.
3. Install the HANDSET P.C.Board.
4. Solder speaker wires back onto the P.C.Board observing correct polarity.
5. If you will align Item (C) RX Input in BASE UNIT, then solder a short wire across the MIC leads. Remember to unsolder this wire after you completed the BASE UNIT alignment.
6. Insert antenna into the case.
7. Install antenna and top P.C.Board mounting screws.
8. Install case back and bottom mounting screws.
9. DO NOT INSTALL THE BATTERY AT THIS TIME!!!!!!

5.8. Handset Reference Drawing



5.9. Base Unit Preparation

Please prepare the BASE UNIT before performing any adjustment procedures. Refer to the BASE UNIT REFERENCE DRAWING for connection and test point locations.

1. Unscrew all 2 screws from bottom of cabinet. Remove cabinet bottom.
2. Remove the antenna screw.
3. Solder a test mode diode **D902** as shown on the BASE UNIT REFERENCE DRAWING.
4. Solder one isolation capacitor's positive lead to the main P.C.Board **TIP** point and the other isolation capacitor's positive lead to the main P.C.Board **RING** point.
5. Connect the Audio Cable, positive lead to the **TIP** isolation capacitor's free lead, the negative lead to the **RING** isolation capacitor's free lead. Do not connect the BNC end of the cable.
6. Connect the Telephone Analyzer **PHONE TEST JACK #1** to the BASE UNIT P.C.Board phone jack.
7. Connect the corded telephone to the Telephone Analyzer **PHONE TEST JACK #2.**
8. Remove main P.C.Board from cabinet top and place beside cabinet.
9. Solder High Frequency Cable open end to ANT and TP-GR as specified in BASE UNIT REFERENCE DRAWING.

5.10. Symptom/Remedy Table

If you have one of the listed symptoms, please refer to this table and make the appropriate adjustments.

SYMPTOM	REMEDY
Transmission sound to HANDSET receiver is unstable	Adiust liems (A) and (C).
Does not link with HANDSET	Adiust liems (C) and (D).

5.11. Base Unit Adjustment Preparation

Please perform the following steps to prepare the BASE UNIT for the Adjustment procedure.

1. Connect P.C.Board to all equipment as specified in **PROCEDURE** section, **SETUP** portion.
2. Connect AC Adaptor to AC Jack of BASE UNIT main P.C.Board.
3. Press **LOCATOR/INTERCOM** button twice. BASE UNIT P.C.Board should be in TEST MODE (CH1 TALK). If unit is not in TEST MODE, remove power from P.C.Board and repeat last step.

ADJUSTMENT ITEM DESCRIPTION	(A) Standard Frequency
EQUIPMENT	**Marconi** SETUP Place in Transmitter Test mode. **AF GEN** **FREQ 1.000kHz** **LEVEL -25 dBm (44mV) at 600 Ω Load** High Frequency Cable to RF connector. **Telephone Analyzer** **Corded Phone** Take phone off hook
PROCEDURE	Adjust **VRfrq** so that **902.100 MHz +/- 3kHz.** Note This item's setup is exactly the same as Item (C). If you have done Item (C), simply look at TX FREQ on the Marconi and make the adjustment.

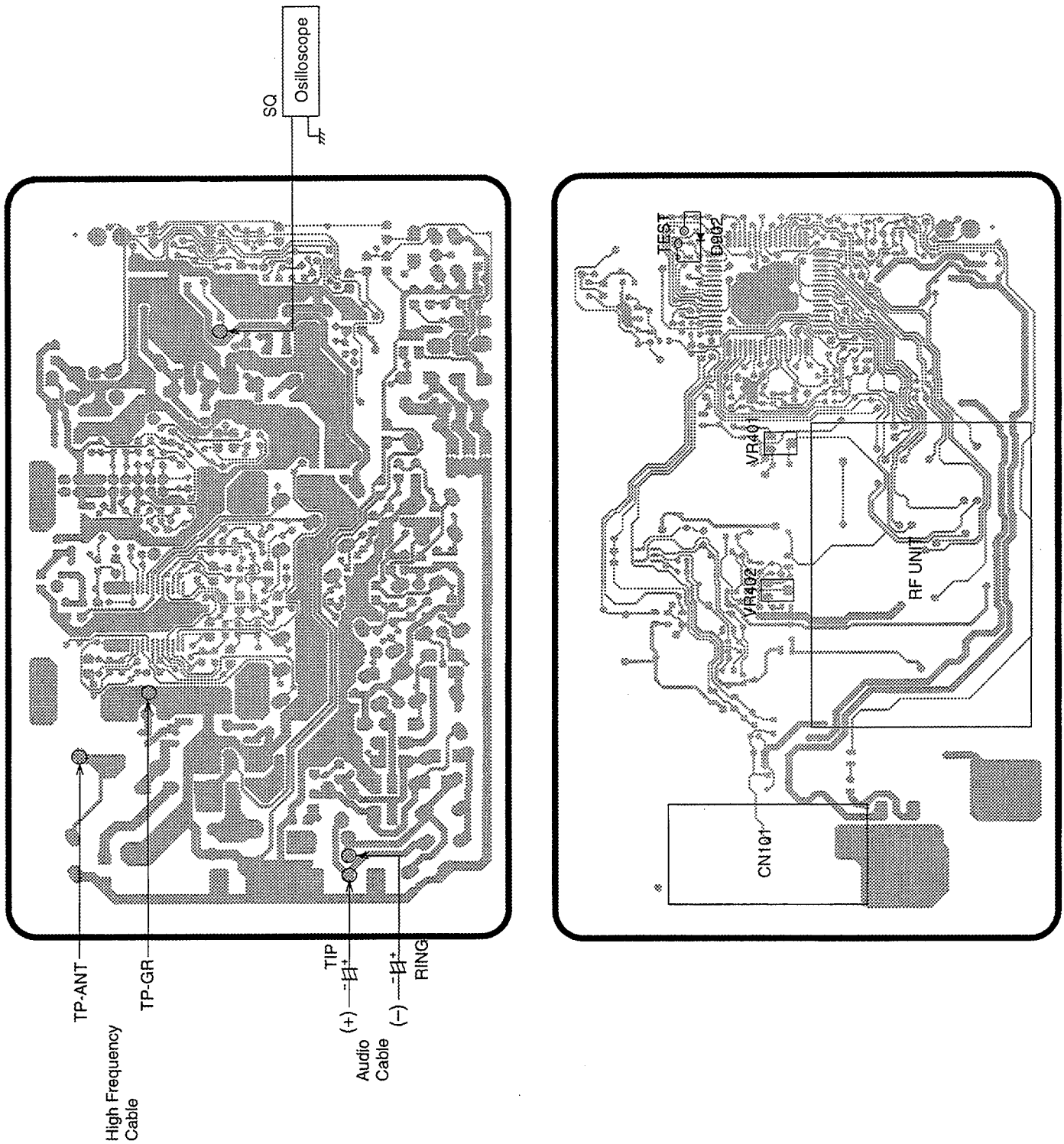
ADJUSTMENT ITEM DESCRIPTION	(B) TX Output
EQUIPMENT	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 926.1000 MHz LEVEL 60 dBμ V SET MOD FREQ 1.000 kHz LEVEL 5.000 kHz High Frequency Cable to RF connector. Audio Cable positive lead to **TIP** isolation capacitor, negative lead to **RING** isolation capacitor, BNC end to AF INPUT connector. **Telephone Analyzer** **Corded Telephone** Take phone off hook
PROCEDURE	Adjust **VR402** until **AF VOLTS** equals **-17.5 dBV +/- 2 dB (-15.5 dBm +/- 2 dB)** Note You do not need to take the corded phone off hook, but you will hear the 1kHz tone. This will insure that your setup is probably working.

ADJUSTMENT ITEM DESCRIPTION	(C) RX Input (Line Modulation)
EQUIPMENT	**Marconi** SETUP Place in Transmitter Test mode. **AF GEN** **FREQ 1.000kHz** **LEVEL -25 dBm (44mV) at 600 Ω Load** High Frequency Cable to RF connector. **Telephone Analyzer** **Corded Phone** Take phone off hook **KX-TC1400B/KX-TC1400W** **Handset** Placed in TEST mode by inserting battery while pressing 1, 9 and *keys, then pressing TALK.
PROCEDURE	Adjust **VR401** until **MOD LEVEL** equals **7.3 kHz+/-1.0 kHz** Notes You need to place the HANDSET in TEST mode to drown spurious RF signals being picked up at the BASE UNIT. By shorting the MIC leads insures that you are sending an unmodulated RF signal. You need the corded phone off hook to keep the telephone analyzer from sending a dial tone to the unit under test. The dial tone adds to the MOD LEVEL value greatly.

ADJUSTMENT ITEM DESCRIPTION	(D) RX sensitivity conformation and squelch adjustment
EQUIPMENT	**Marconi** SETUP Put in Receiver Test Mode. RF GEN FREQ 926.1000 MHz LEVEL 60 dBμV SET MOD FREQ 1.000 kHz LEVEL 5.000 kHz High Frequency cable to left RF Connector. Audio Cable positive lead to **TIP** isolation capacitor, negative lead to **RING** isolation capacitor, BNC end to AF INPUT connector. **Oscilloscope** SETUP X1 probe connected to INPUT 1. Probe ground connected to **GND.** TIME/DIV 1ms VOLT/DIV 1V Auto trigger **Telephone Analyzer** **Corded Phone** Take off hook
PROCEDURE	On Marconi, press SINAD until the display shows the SINAD value and press **dB.** Then press RF **GEN** and **LEVEL.** Lower RF **GEN LEVEL** at SINAD 12 dB and confirm that RF GEN LEVEL is less than **+2 dBμV (+8 dBμVem*f*).** When level is more than +2 dBμV (+8 dBμVem*f*), change RF unit. Attach the oscilloscope probe to SQ POINT. When RF GEN LEVEL is set at +5 dBμV (+11 dBμVem*f*), confirm that SQ POINT is Low. After that, set RF GEN LEVEL at -17 dBμV (-11 dBμVem*f*), and confirm that the SQ POINT is High. When level is NG, change RF unit.

Once aligned, please reassemble the base unit. Also take off the back of the HANDSET and unsolder the MIC lead short wire if you previously installed it.

5.12. Base Unit Reference Drawing



6 HOW TO CHECK THE RF UNIT

Factory supply only assembled RF unit for base unit and Handset of KX-TC1400B/KX-TC1400W. (Factory does not supply each parts on RF Unit.)

6.1. Handset

1. Warm up the Marconi Radio Tester for at least 30 minutes to allow internal crystal oscillation to become stable.
2. Refer to figures right for Handset wire connections.
3. Disconnect the Handset antenna from the PCB. If you allow the antenna to remain and be a load, the readings will be wrong.
4. Supply DC 3.9V Handset PCB using a DC power supply.
5. Solder RF cable to TP-ANT and TP-GND and connect BNC side to Marconi. Use 100 W max. RF Input.
6. Press **TALK**, then press "**5**", "**8**" and "**0**" simultaneously.
7. Press **TALK**. (Base Unit power is off)

6.1.1. Carrier frequency check:

1. Set Marconi to Transmit Test (press **TX TEST** button).
2. Check TX Frequency =**926.100 MHz+/-3.0 kHz**.
3. When value if off, adjust **VRfreq**.
4. If can't adjust replace RF Unit.

6.1.2. Transmit power check:

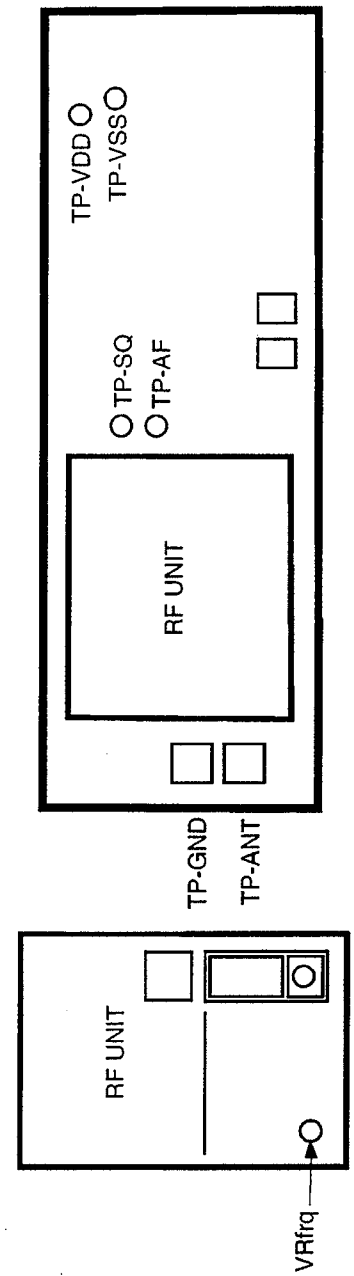
1. Press **dBm** button on Marconi.
2. Check Marconi TX Power reading. It should equal **-3.5 dBm+/-4 dBm** (-7.5 dBm ~ +1.5 dBm).
3. When value is over, replace RF Unit.

6.1.3. Receiving sensitivity check:

1. Connect audio cable BNC side to AF INPUT in Marconi and other side to TP-AF and TP-GND.
2. Set Marconi to **RX TEST** mode. Enter the following setting:
   a. Frequency = **902.100 MHz**
   b. Level = **60 dBµV**
   c. Set Modulation = **1.000 kHz**
   d. Level = **6.000 kHz**
3. Press the **SINAD** button on Marconi until the display shows SINAD value. Press the **dB** button.
4. Press the **RF GEN** and **LEVEL** button.
5. Using the **VARIABLE** knob on Marconi decrease RF GEN LEVEL value until **SINAD** value is **12 dB**.
6. Check the **RF GEN LEVEL**. This should be **less than +1 dBµV**(+7 dBµVemf). When value is over, replace RF Unit.

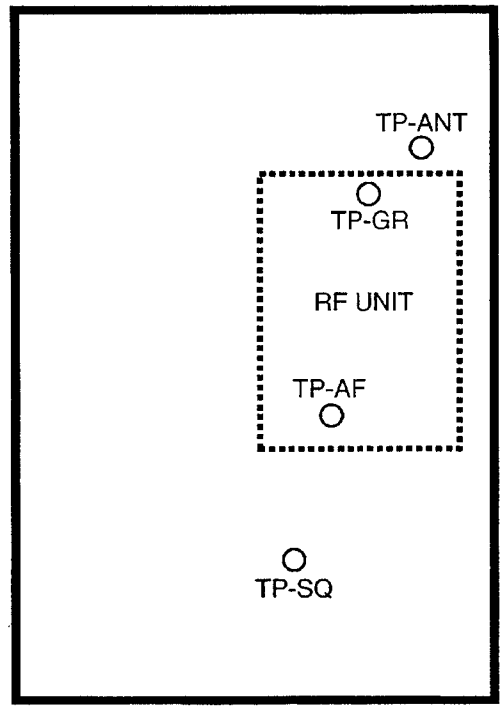
6.1.4. Squelch check:

1. Connect scope probe (X1) lead to TP-SQ, negative to TP-VSS and BNC end to scope.
2. Set scope to the following codition: TIME/DIV = 1 msec, VOLT/DIV = 1 V
3. Set **RF GEN LEVEL** to **+5 dBµV**(+11dBµVemf). Check scope voltage is **LOW**.
4. Set **RF GEN LEVEL** to **-17 dBµV**(-11dBµVemf). Check scope voltage is **HIGH**.
5. When scope voltage is wrong, replace RF Unit.



6.2. Base Unit

1. Please refer to figures right for base unit wire connection.
2. Solder wire connections D902. (Refer to **5.12. Base Unit Reference Drawing**.)
3. Connect the AC Adaptor (KX-TCA1-G) to base unit.
4. Press HANDSET LOCATOR twice to set base to test mode.



6.2.1. Carrier frequency check:

1. Solder RF cable to TP-ANT and TP-GR.
2. Set Marconi to Transmit Test mode by pressing **TX TEST**.
3. Check TX Frequency as shown on CRT. This should be **902.100 MHz+/-3 kHz**.
4. Adjust value when this is above **902.100 MHz+/-3 kHz**. If can't adjust replace RF Unit.

6.2.2. Transmit power check:

Check **TX POWER** reading equals to **-10 dBm+/-4 dBm** (reading should -14 dBm to -6 dBm).

If reading is given in µW, press **dB** button.

6.2.3. Receiving sensitivity check:

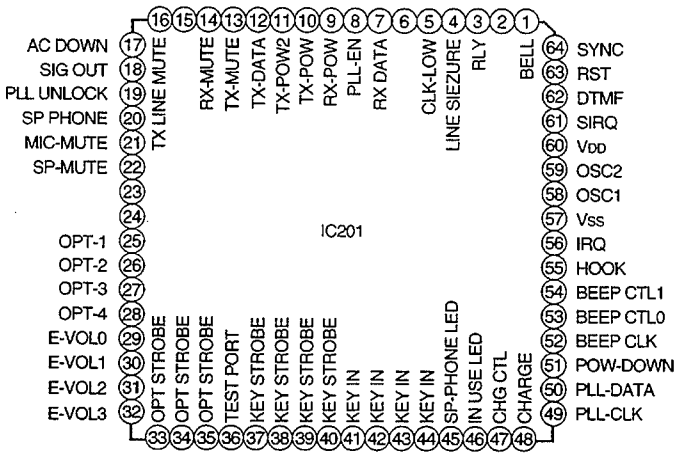
1. Connect audio cable positive lead to TP-AF, negative lead to TP-GR and BNC end to AF INPUT.
2. Set Marconi to Receiver Test mode by pressing **RX TEST**. Enter the following value:
   a. RF Frequency = **926.100 MHz**
   b. LEVEL = **60 dBµV**
   c. Modulation Frequency = **1.000 kHz**
   d. LEVEL = **5.000 kHz**
3. Press **SINAD** button until the display shows the SINAD value and press **dB** button.
4. Press **RF GEN** and **LEVEL** buttons. Using the **VARIABLE** knob. Decrease RF GEN LEVEL until **SINAD** value is **12 dB**.
5. Check the **RF GEN LEVEL** equals **less than +2 dBµV**(+8 dBµVemf). When value is over, change RF Unit.

6.2.4. Squelch check:

1. Keep same RX TEST settings as in **Receiving Sensitivity Check**.
2. Connect scope (X1) positive lead to TP-SQ, negative lead to TP-GR and BNC end to scope. Set scope to following condition.
   a. TIME/DIV =**1 msec**.
   b. VOLT/DIV = **1 V**
3. Set **RF GEN LEVEL** to **+5 dBµV** (+11 dBµVemf). Check scope voltage is **LOW**.
4. Set **RF GEN LEVEL** to **-17 dBµV** (-11 dBµVemf). Check the scope voltage is **HIGH**.
5. When value is over, replace RF Unit.

7 CPU DATA (Base Unit)

7.1. IC201

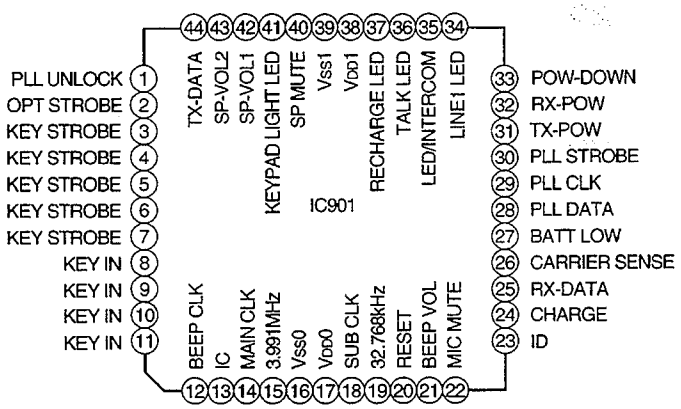


Pin	Description	I/O	High	High-Z	Low
1	BELL	I	Hi	-	Lo
2	Not Used	O	-	-	Fixed
3	RLY	O	ON	-	OFF
4	LINE SIEZURE	O	ON	-	OFF
5	CLK LOW	O	-	Normal	LOW
6	Not Used	O	-	-	Fixed
7	RX DATA	I	DATA	-	DATA
8	PLL-EN	O	ON	-	OFF
9	RX POWER	O	OFF	-	ON
10	TX POWER	O	OFF	-	ON
11	TX POWER2	O	OFF	-	ON
12	TX DATA	O	DATA	-	DATA
13	TX MUTE	O	ON	-	OFF
14	RX MUTE	O	ON	-	OFF
15	Not Used	O	-	-	Fixed
16	TX LINE MUTE	O	ON	-	OFF
17	AC DOWN	I	-	-	-
18	SIG OUT	I	Weak Electric Field	-	Strong Electric Field
19	PLL UNLOCK	I	Lock	-	Unlock
20	SP PHONE	O	-	Normal	Active
21	MIC MUTE	O	ON	-	OFF
22	SP MUTE	O	ON	-	OFF
23	Not Used	O	-	-	Fixed
24	Not Used	O	-	-	Fixed
25	OPT-1	I	None	-	Provided
26	OPT-2	I	None	-	Provided
27	OPT-3	I	None	-	Provided
28	OPT-4	I	None	-	Provided
29	E-VoL0	O	-	Lo:Min ~ Hi:Max	
30	E-VoL1	O	-	Hi Hi	
31	E-VoL2	O	-	Lo Hi	
32	E-VoL3	O	-	Lo Hi	

Pin	Description	I/O	High	High-Z	Low
33	OPT STROBE	O	-	Normal	Active
34	OPT STROBE	O	-	Normal	Active
35	OPT STROBE	O	-	Normal	Active
36	TEST PORT	I	None	-	Provided
37	KEY STROBE	O	-	-	Normal
38	KEY STROBE	O	-	Active	Normal
39	KEY STROBE	O	-	Active	Normal
40	KEY STROBE	O	-	Active	Normal
41	KEY IN	I	OFF	-	ON
42	KEY IN	I	OFF	-	ON
43	KEY IN	I	OFF	-	ON
44	KEY IN	I	OFF	-	ON
45	SP-PHONE LED	O	-	OFF	ON
46	INUSE LED	O	-	OFF	ON
47	CHG CTL	O	Ultra	-	Trickle
48	CHARGE	I	NONE CHARGE	-	CHARGE
49	PLL CLOCK	O	Active	Normal	Active
50	PLL DATA	O	Active	Normal	Active
51	POWER DOWN	I	Normal	-	DOWN
52	BEEP CLOCK	O	Active	Normal	Active
53	BEEP CTL0	O	-	Hi:Hi Hi:Lo Lo:Reception Tone	
54	BEEP CTL1	O	-	Hi Lo Hi	
55	HOOK	I	OFF HOOK	-	HOOK
56	EXTERNAL INTERRUPT	I	Normal	-	-
57	GND		-	-	Normal
58	OSC1	I	Active	-	Active
59	OSC2	O	Active	-	Active
60	POWER SUPPLY		Normal	-	-
61	EXTERNAL INTERRUPT	I	Normal	-	-
62	DTMF	O	Active	Normal	Active
63	RESET	I	Normal	-	Reset
64	SYSTEM SYNC. IDLE	O	Active	-	Active

8 CPU DATA (Handset)

8.1. IC901

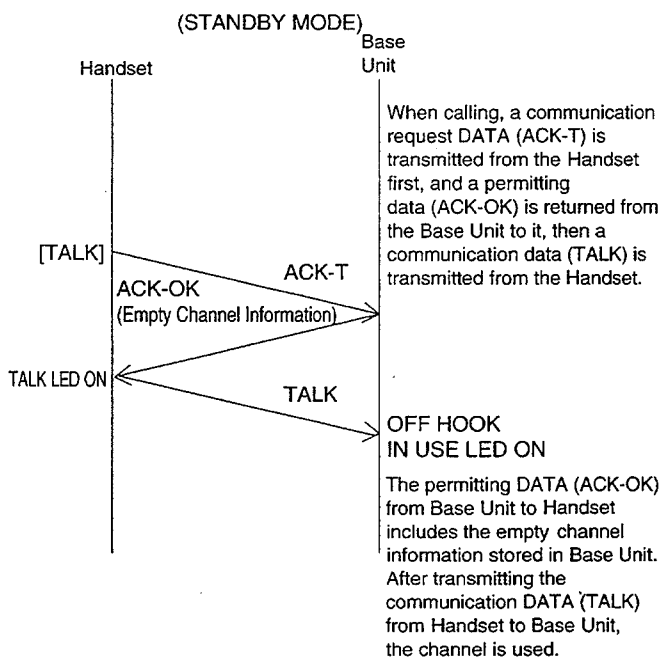


Pin	Description	I/O	High	High-Z	Low
1	PLL UNLOCK	I	Lock		Unlock
2	OPTION STROBE	O	Normal		(Active)
3	KEY STROBE	I/O		(Active)	Normal
4	KEY STROBE	I/O		(Active)	Normal
5	KEY STROBE	I/O		(Active)	Normal
6	KEY STROBE	I/O		(Active)	Normal
7	KEY STROBE	I/O		(Active)	Normal
8	KEY IN	I	Normal		Key In
9	KEY IN	I	Normal		Key In
10	KEY IN	I	Normal		Key In
11	KEY IN	I	Normal		Key In
12	BEEP CLOCK	O	Normal		(Beep)
13	IC	-			
14	MAIN CLOCK	-			
15	3.991MHz	I			
16	Vss0	-			
17	VDD0	-			
18	SUB CLOCK	-			
19	32.768kHz	I			
20	RESET	I	Normal		Reset
21	BEEP VOLUME	O	Low		High
22	MIC MUTE	O	Mute		Unmute
23	ID(CONTROL)	I	Normal		(DATA)
24	CHARGE	I	Off CHARGE		CHARGE
25	RX DATA	I	Normal		(DATA)
26	CARRIER SENSE	I	Strong Electric Field		Weak Electric Field
27	BATTERY LOW	I	Battery High		Battery Low
28	PLL DATA	O	Normal		(DATA)
29	PLL CLOCK	O	Normal		(Clock)
30	PLL STROBE	O	Latch		Normal
31	TX POWER	O	OFF		ON
32	RX POWER	O	OFF		ON

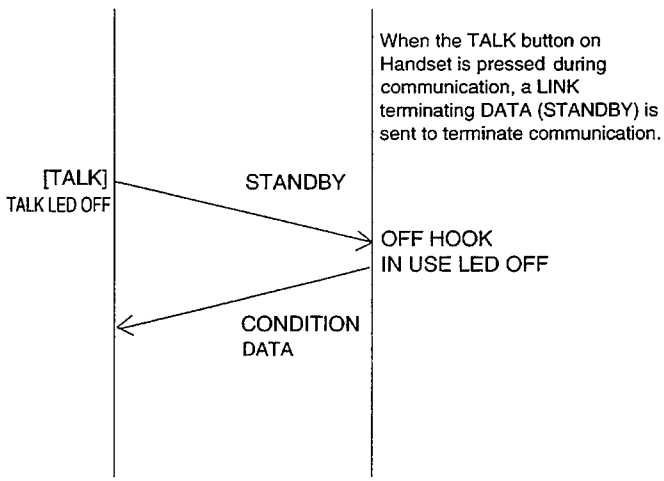
Pin	Description	I/O	High	High-Z	Low
33	POWER DOWN	I	Normal		POWER DOWN
34	LINE1 LED	O			Normal
35	LINE2 LED/ INTERCOM	I/O		OFF	ON
36	TALK LED	I/O		OFF	ON
37	RECHARGE LED	I/O		OFF	ON
38	VDD1	-	Normal		
39	Vss1	-			Normal
40	SP MUTE	O	Mute		Unmute
41	KEYPAD LIGHT LED	O	ON		OFF
42	SP VOL1	O	Low Low	Low Medium	High High
43	SP VOL2	O	Low (-7dB)	High (0dB)	Low (+7dB)
44	TX DATA	O	High		Normal

9 EXPLANATION OF CPU DATA COMMUNICATION

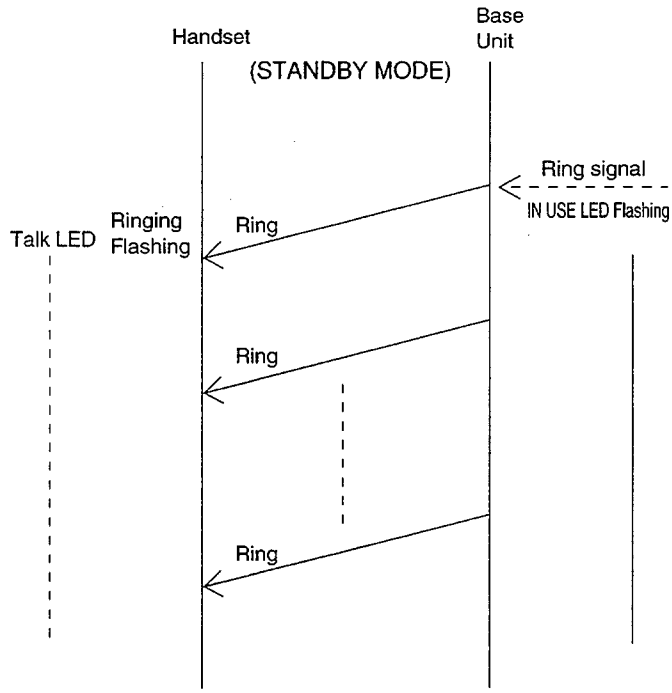
9.1. Calling


(STANDBY MODE)
Handset
Base Unit
When calling, a communication request DATA (ACK-T) is transmitted from the Handset first, and a permitting data (ACK-OK) is returned from the Base Unit to it, then a communication data (TALK) is transmitted from the Handset.
[TALK]
ACK-T
ACK-OK
(Empty Channel Information)
TALK LED ON
TALK
OFF HOOK
IN USE LED ON
The permitting DATA (ACK-OK) from Base Unit to Handset includes the empty channel information stored in Base Unit. After transmitting the communication DATA (TALK) from Handset to Base Unit, the channel is used.

9.2. To Terminate Communication


When the TALK button on Handset is pressed during communication, a LINK terminating DATA (STANDBY) is sent to terminate communication.
[TALK]
TALK LED OFF
STANDBY
OFF HOOK
IN USE LED OFF
CONDITION DATA

9.3. Ringing



After detecting the Ring signal from circuit, Base Unit sends a ring signal DATA (Ring), then the Handset starts ringing.

9.4. Ports for Transmitting and Receiving of Data

Handset:

transmitting ... 44 Pin receiving ... 25 Pin

Base Unit:

transmitting ... 12 Pin receiving ... 7 Pin

9.5. Waveform of DATA Used for Cordless Transmission and Reception

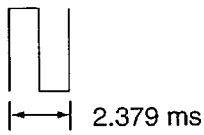
The DATA which is transmitted from the Handset to the Base Unit is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data.

The DATA which is transmitted from the Base Unit to the Handset is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data.

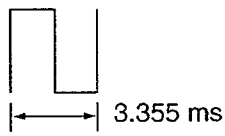
9.5.1. Handset

Transmitting DATA Format

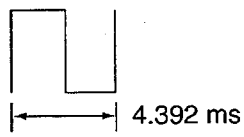
DATA 0



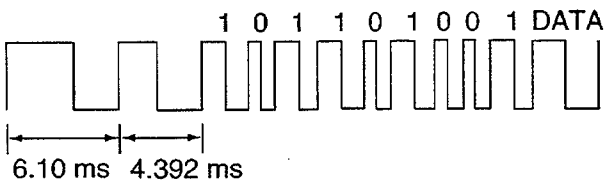
DATA 1



DATA Delimit

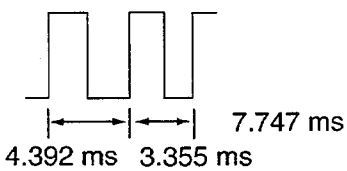


Pre data



41.175 ms

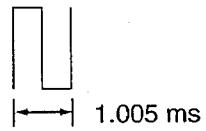
END data



9.5.2. Base Unit

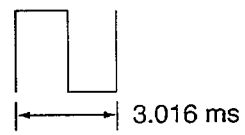
Transmitting DATA Format

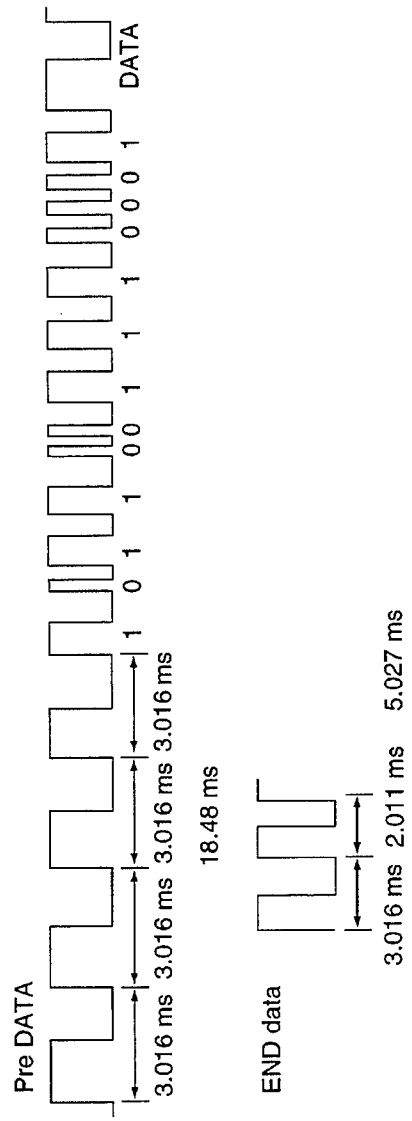
DATA 0



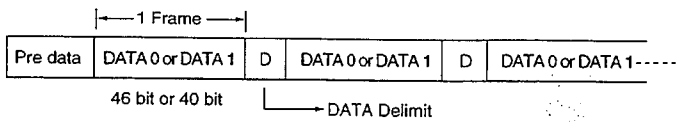
DATA 1

DATA Delimit



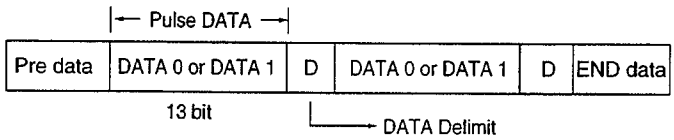


9.6. When LINKing



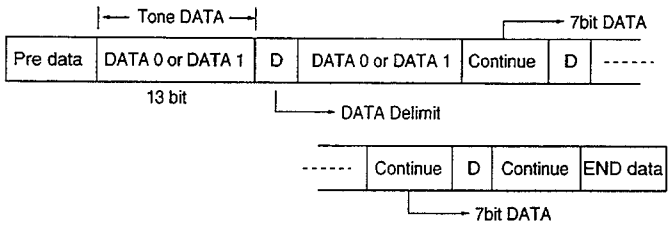
When LINKing from the Handset (when becoming STBY to TALK), DATA is transmitted in above format. The combined portion of DATA 0 and DATA 1 is transmitted in LINK requesting DATA (40bit) format first. Then, when LINK OK (ACK-OK) DATA (46bit) is returned from the Base Unit, it is sent as LINK from DATA after changing the combination of DATA 0 and DATA 1. And the DATA Delimit is between each Frame as a stop.
The contents of LINK requesting DATA and LINK form DATA are different depending on each operation.

9.7. Pulse Dial



When executing Pulse Dial, the Pulse Dial DATA is transmitted from the Handset to the Base Unit in above format. The combination of DATA 0 and DATA 1 are changed by each Dial No. And the DATA Delimt is between each Frame as a stop. The number of Frame is 2.

9.8. Tone Dial



When executing Tone Dial, Tone Dial DATA is transmitted from the Handset to the Base Unit in above format. The DATA is changed by Dial No. as same as Pulse Dial. When Tone Dialing, DATA (Continue DATA) that the key is pressed continuously is sent to the Base Unit during the key is pressed. When depressing the key, the END data is sent finally.

Note:

1,000,000 kinds of the security code are available for the mode KX-TC1400B/KX-TC1400W. Each time the Handset is set on the cradle of the base unit (for charging), the CPU automatically change the security code.

10 FREQUENCY TABLE (MHz)

CH	Base Unit TX Handset RX	Base Unit RX Handset TX
1	902.100 MHz	926.100 MHz
2	902.150 MHz	926.150 MHz
3	902.200 MHz	926.200 MHz
4	902.250 MHz	926.250 MHz
5	902.300 MHz	926.300 MHz
6	902.350 MHz	926.350 MHz
7	902.400 MHz	926.400 MHz
8	902.450 MHz	926.450 MHz
9	902.500 MHz	926.500 MHz
10	902.550 MHz	926.550 MHz
11	902.600 MHz	926.600 MHz
12	902.650 MHz	926.650 MHz
13	902.700 MHz	926.700 MHz
14	902.750 MHz	926.750 MHz
15	902.800 MHz	926.800 MHz
16	902.850 MHz	926.850 MHz
17	902.900 MHz	926.900 MHz
18	902.950 MHz	926.950 MHz
19	903.000 MHz	927.000 MHz
20	903.050 MHz	927.050 MHz
21	903.100 MHz	927.100 MHz
22	903.150 MHz	927.150 MHz
23	903.200 MHz	927.200 MHz
24	903.250 MHz	927.250 MHz
25	903.300 MHz	927.300 MHz
26	903.350 MHz	927.350 MHz
27	903.400 MHz	927.400 MHz
28	903.450 MHz	927.450 MHz
29	903.500 MHz	927.500 MHz
30	903.550 MHz	927.550 MHz

K, (Q),
KXTC1400B-AK
KXTC1400W-AK
Printed in Japan